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JOURNAL

OF THE

AMERICAN GEOGRAPHICAL SOCIETY

OF

NEW YORK

MDCCCLXXXVIII

AM. GEOGRAPHICAL SOC.
UBIQUE
NEW YORK 1854.

VOL. XX.

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AMERICAN GEOGRAPHICAL SOCIETY.

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1888.

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AUG 5 1914
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CONTENTS.

PAGE

List of Officers and Councillors iii
Charter of Incorporation vii
Amended Charter ix
By-Laws xi
Honorary and Corresponding Members xix
Fellows xx
Fellows Deceased—1888 xxxvi
Alphabetical List of Foreign and Domestic Geographical and other Scientific Bodies with which this Society is in Correspondence and Exchange of Publications xxxvii
Additions to Library and Map-Room, by Gift and Purchase xlii
Transactions of the Society—1888 lxi

PAPERS READ BEFORE THE SOCIETY AND CONTRIBUTED.

Annual Address by CHAS. P. DALY, LL.D., President: Recent Geographical Work of the World 1
Ancient Cities of America, by Prof. F. A. OBER 39
Commercial Geography of the American Interoceanic Canal, by Lieut.-Comm. C. H. STOCKTON, U. S. N. 75
Four Days in Petra, by WM. BUTLER OGDEN. 137
The City of Mexico, by Hon. CLARENCE PULLEN 153
The Origin of the Name "America," by GEO. C. HURLBUT 183
Who First Saw the Labrador Coast? by Prof. A. S. PACKARD . . . 197
The Geographical Evolution of Labrador, by Prof. A. S. PACKARD . . 208
Tierra del Fuego and the Sahara, Communication from E. REUEL SMITH . 231
Moscow the Magnificent, by Prof. WM. LIBBEY, Jr. 273
Finistère: the Artist's Corner of Brittany, by F. S. DELLENBAUGH . . 295
A Summer's Cruise to Northern Labrador, by Prof. A. S. PACKARD . 337, 445
China and Its Progress, by Maj. Gen. JAS. HARRISON WILSON . . . 401
The Portuguese in the Track of Columbus, by Dr. P. J. J. VALENTINI . . 432
The Past History of Vulcano, by Prof. E. CHAIX 463
Lake Mistassini, by GEO. C. HURLBUT 469
The Philosophy of Glacier Motion, by Prof. WM. LUTTRELL ROGERS . . 481
The Problem of Interoceanic Communication by Way of the American Isthmus, by ANTHONY DE GOGORZA. 502
Geographical Notes, by GEO. C. HURLBUT 94, 235, 364, 514
Washington Letter. 268, 399
Obituary: Henry E. Pierrepont 135
" Joseph W. Drexel. 136
" Theodorus Bailey Myers 271
" Rear-Admiral Charles H. Baldwin, U. S. N. 559

CHARTER OF INCORPORATION.

GRANTED APRIL 13, 1854.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. George Bancroft, Henry Grinnell, Francis L. Hawks, John C. Zimmerman, Archibald Russell, Joshua Leavitt, William C. H. Waddell, Ridley Watts, S. De Witt Bloodgood, M. Dudley Bean, Hiram Barney, Alexander J. Cotheal, Luther B. Wyman, John Jay, J. Calvin Smith, Henry V. Poor, Cambridge Livingston, Edmund Blunt, Alexander W. Bradford, and their associates, who are now or may become hereafter associated for the purposes of this act, are hereby constituted a body corporate by the name of "The American Geographical and Statistical Society," for the purpose of collecting and diffusing geographical and statistical information.

§ 2. For the purposes aforesaid, the said Society shall possess the general powers and privileges, and be subject to the general liabilities, contained in the third title of the eighteenth chapter of the first part of the Revised Statutes, so far as the same may be applicable, and may not have been modified or repealed; but the real and personal estate which the said Society shall be authorized to take, hold, and convey, over and above its library, and maps, charts, instruments, and collections, shall not at any time exceed an amount the clear yearly income of which shall be ten thousand dollars.

§ 3. The officers of said Society shall be a president, three vice-presidents, a corresponding secretary, a recording secretary, a librarian, and a treasurer and such other officers as may from time to time be provided for by the by-laws of the said Society.

§ 4. The said Society, for fixing the terms of admission of its members, for the government of the same, for changing and altering the officers above named, and for the general regulation and management of its transactions and affairs, shall have power to form a code of by-laws, not inconsistent with the laws of this State, or of the United States, which code, when formed and adopted at a regular meeting, shall, until modified or rescinded, be equally binding as this act upon the said Society, its officers, and its members.

5. The Legislature may, at any time, alter or repeal this act.
6. This act to take effect immediately.

STATE OF NEW YORK, } *ss.:*
Secretary's Office, }

I have compared the preceding with the original law on file in this office, and hereby certify the same to be a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this [L. S.] thirteenth day of April, one thousand eight hundred and fifty-four.

A. G. JOHNSON,
Deputy Secretary of State.

AMENDED CHARTER.

PASSED APRIL 8, 1871.

STATE OF NEW YORK, NO. 237, IN SENATE. *March* 7, 1871.—Introduced with unanimous consent, by Mr. Bradley; read twice, and referred to the Committee on Literature; reported favorably from said committee, and committed to the Committee of the Whole.

CHAP. 373.

AN ACT in relation to The American Geographical and Statistical Society.

PASSED April 8, 1871.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The name or corporate title of the said Society shall hereafter be The American Geographical Society of New York.

§ 2. The object of the said Society shall be the advancement of geographical science; the collection, classification and scientific arrangement of statistics, and their results; the encouragement of explorations for the more thorough knowledge of all parts of the North American continent, and of other parts of the world which may be imperfectly known; the collection and diffusion of geographical, statistical and scientific knowledge, by lectures, printed publications, or other means; the keeping up of a correspondence with scientific and learned societies in every part of the world, for the collection and diffusion of information, and the interchange of books, charts, maps, public reports, documents, and valuable publications; the permanent establishment in the city of New York of an institution in which shall be collected, classified, and arranged, geographical and scientific works, voyages, and travels, maps, charts, globes, instruments, documents, manuscripts, prints, engravings, or whatever else may be useful or necessary for supplying full, accurate, and reliable information in respect to every part of the globe, or explanatory of its geography, physical and descriptive; and its geological history, giving its climatology, its productions, animal, vegetable, and mineral; its exploration, navigation, and commerce; having especial reference to that kind of information which should be collected, preserved, and be at all times accessible for public uses in a great maritime and commercial city.

§ 3. The power given by the act hereby accorded to the said Society, to take, hold, convey, manage, and make use of its real and personal estate, shall be understood as authorizing said Society to take and hold by gift, grant, bequest, devise, subject to all provisions of law relative to devises and bequests by last will and testament, or purchase real estate to the value of three hundred thousand dollars, and to invest its income, or its personal estate generally, so as to produce a regular annual income sufficient for the accomplishment of the purposes set forth in the first section of this act; but said annual income shall not exceed twenty-five thousand dollars annually.

§ 4. The said Society shall make an annual report of its proceedings to the Legislature.

STATE OF NEW YORK,
Office of Secretary of State, } *ss.*:

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this twenty-second day of May, in the year one thousand eight hundred and seventy-one.

[L. S.]

DIEDRICH WILLERS, JR.,
Deputy Secretary of State.

BY-LAWS.

CHAPTER I.

TITLE.

The title of the Society is, "The American Geographical Society."

CHAPTER II.

OBJECTS.

The objects of the Society are, "The collecting and diffusing of geographical and statistical information."

CHAPTER III.

MEMBERS.

1. The Society shall consist of Fellows, Honorary, Corresponding, and *ex-officio* members.

2. Honorary members shall be chosen on account of their distinction in the science of geography or statistics, and not more than twelve of them shall hereafter be elected in any one year.

3. Corresponding members shall be chosen from those who have aided the advancement of geography or statistics.

4. *Ex-officio* members shall be foreign diplomatic representatives and consuls resident in the United States; and United States diplomatic representatives and consuls in foreign countries.

4. Fellows and Corresponding and Honorary members shall be elected as follows: All nominations of candidates shall be openly made in writing at a meeting of the Society, or the Council, by a member thereof, and, together with the name of the member making them, entered on the minutes. The persons thus nominated, when

approved by the Council and elected by the Society, shall, on payment of the initiation fee, if nominated as Fellows, and without such payment if nominated as Corresponding or Honorary members, become members of the Society accordingly.

6. Persons entitled to become *ex-officio* members of the Society shall, on the recommendation of the Council, be, by the Society, constituted and declared to be such members.

7. The name of any member of the Society may, on the recommendation of the Council, and by a vote of two thirds of the members present at a stated meeting of the Society, be dropped from the roll of its members.

CHAPTER IV.

INITIATION FEE AND ANNUAL DUES.

1. The initiation fee, including the dues for the current year, shall be, for a Fellow, ten dollars, to be paid immediately on election.

2. The annual dues thereafter shall be, for a Fellow, ten dollars, to be paid in advance.

3. Any Fellow of the Society, not in arrears, may commute for life all dues for fellowship by the payment at one time, if a Fellow, of one hundred dollars.

4. The name of any Fellow of the Society neglecting for two successive years to pay his annual dues, or at any time wholly refusing to pay them, may by the Council be erased from the list of Fellows of the Society.

5. The fiscal year of the Society shall, for all purposes, be the calendar year—that is, commence on the first day of January, and end with the 31st day of December in each year.

CHAPTER V.

OFFICERS.

1. The officers of the Society shall be a president, three vice-presidents, a foreign corresponding secretary, a domestic corresponding secretary, a recording secretary, a treasurer, and fifteen councillors; and these, together, shall form the Council of the Society.

2. The officers and members of Council elected at the next

annual election (except the president and treasurer) shall, at their first meeting, divide themselves into three classes, each to embrace one vice-president, one secretary, and five members of the Council; one of which classes shall hold office one year, one for two years, and another for three years, to be determined at said meeting by lot or otherwise. The president and treasurer shall always be elected annually; and at each annual election thereafter there shall be elected a vice-president, a secretary, and five members of Council, each for the term of three years.

3. All officers of the Society to be chosen at any election may be voted for on one ballot.

CHAPTER VI.

ANNUAL MEETING.

1. The annual meeting of the Society shall be held on the second Tuesday after the first day of January in each and every year hereafter, when the annual election of the officers of the Society shall take place; and if, from any cause, there shall be a failure of the annual election at the time above designated for that purpose, the same may be held on the Tuesday next following—that is, on the third Tuesday after the first day of January in each year—and of which due notice shall be given.

2. Every member of the Society, who has been such for twenty days or more, and who is not in arrears for his dues for the past year, shall be entitled to vote at the said election.

3. At the annual meeting of the Society the Council shall present a general report of its proceedings and of those of the Society during the past year, and the secretaries and the treasurer shall also present their annual reports.

CHAPTER VII.

MONTHLY AND SPECIAL MEETINGS.

1. The Society, unless otherwise specially ordered by the Society or the Council, shall hold its stated meetings for the transaction of business on the second Tuesday of each month of the year, except July, August, and September.

2. The president, or, in his absence, one of the vice-presidents, may, and upon the written request of five members, shall, call a

special meeting of the Society by giving three days' notice thereof in two daily newspapers published in the city of New York.

CHAPTER VIII.

ORDER OF BUSINESS.

1. At all stated meetings of the Society for the transaction of ordinary business the order of proceedings shall be as follows:

1. Reading of the Minutes.
2. Reports and Communications from Officers of the Society.
3. Reports from the Council.
4. Reports from Committees.
5. Nominations of Members.
6. Special Orders.
7. Unfinished Business.
8. Miscellaneous Business.
9. Papers Read and Addresses Delivered before the Society.

2. All propositions presented for the action of the Society at any of its meetings shall be in writing, when requested by the presiding officer or any member. A proposition thus presented, when seconded and the question thereon stated from the chair, shall be deemed to be in the possession of the Society and open for discussion, but may be withdrawn by the mover at any time before amendment or decision.

3. No member shall speak more than once upon the same question until all the other members present desiring to speak shall have spoken, nor more than twice on any question without leave of the Society.

CHAPTER IX.

QUORUM.

At all meetings of the Society nine members present shall constitute a quorum for the transaction of business.

CHAPTER X.

COMMITTEES.

All committees authorized by the Society shall, unless otherwise specially ordered, consist of three members each, and be appointed by the presiding officer.

CHAPTER XI.

PRESIDING OFFICER.

At all meetings of the Society, on the arrival of the appointed hour and the presence of a quorum, the president, or in his absence one of the vice-presidents, or in the absence of both a chairman *pro tem.*, shall immediately take the chair, call the meeting to order, and preside. He shall have only a casting vote. He shall preserve order and decide all questions of order, subject to an appeal to the Society. He shall also, unless otherwise specially ordered, appoint all committees authorized by the Society ; and at every annual election, before the opening of the polls, he shall appoint two tellers of the election.

CHAPTER XII.

SECRETARIES.

1. Foreign Corresponding Secretary.—It shall be the duty of the foreign corresponding secretary to conduct the general correspondence of the Society with individuals and associate bodies in foreign countries.

2. Domestic Corresponding Secretary.—It shall be the duty of the domestic corresponding secretary to conduct the Society's general correspondence with individuals and associate bodies in the United States.

3. Both the foreign and domestic secretaries shall keep in suitable books to be provided for that purpose, at the Society's rooms, true copies of all letters written by them respectively on behalf of the Society ; and shall preserve, on proper files, at the said rooms, all letters received by them on the same account ; and at each stated meeting of the Society or the Council, they shall respectively report their correspondence, and read the same, or such parts thereof as may be required.

4. In case of vacancy in the office of either of the corresponding secretaries, or in the absence or disability of either of these officers, the duties of both may be performed by the other corresponding secretary.

5. The Society may designate a particular officer, or appoint a committee to prepare a letter or letters on any special occasion.

6. Recording Secretary.—It shall be the duty of the recording

secretary to give due notice of the time and place of all meetings of the Society, and to attend the same. He shall keep fair and accurate minutes of the proceedings of the Society, and record the same, when approved, in the Society's Journal. He shall give immediate notice to the several officers and committees of the Society, of all votes, orders, resolves, and proceedings of the Society affecting them or appertaining to their respective duties. He shall prepare a list of the members of the Society entitled to vote, to be handed to the tellers before the opening of the polls at each annual election. He shall officially sign and affix the corporate seal of the Society to all diplomas and other instruments or documents authorized by the Society or Council. He shall have charge of the corporate seal, charter, by-laws, records, and general archives of the Society, except so far as they may be expressly placed under the charge of others. He shall certify all acts and proceedings of the Society, and shall notify the Council of the death, resignation, or removal of any officer or member of the Society. He shall have charge of the rooms of the Society, and shall perform all such other and further duties as may from time to time be devolved upon him by the Society or the Council. He, together with the Council, shall have the charge and arrangement of the books, maps, and collections belonging to the Society. He shall cause to be kept in the rooms of the Society a registry of all donations to the library or collections of the Society, acknowledge their receipt by letter to the donors, and report the same in writing to the Society at its next stated meeting.

7. All documents relating to the Society and under the charge of the secretaries respectively, shall be placed in such depositories in the rooms of the Society as the Council may provide and designate for that purpose.

CHAPTER XIII.

TREASURER.

The Treasurer shall have charge of and safely keep all contracts, certificates of stock, securities, and muniments of title belonging to the Society. He shall collect the dues and keep the funds of the Society, and disburse the same under the direction of the Council; and so often as the said funds in the hands of the treasurer shall amount to one hundred dollars, he shall deposit the same, in the name of the Society, in some incorporated bank in the city of New York, to be designated for that purpose by the Council; and the said funds, thus deposited, shall be drawn out of the said bank on the check of the treasurer, countersigned by the chairman of the Council, and only for the legitimate and authorized purposes of the Society. The treasurer shall, previous to the annual meeting of the Society, prepare and submit to the Council for audit, a detailed account of his receipts and disbursements for account of the Society during the past year; and which annual account, duly audited, he shall present, with his general report, to the Society at its annual meeting.

CHAPTER XIV.

COUNCIL.

1. The Council shall have the management and control of the affairs, property, and funds of the Society, and shall designate an incorporated bank in the city of New York, where the said funds shall, from time to time as they accrue, be deposited by the treasurer.

2. It may frame its own by-laws, not inconsistent with the charter or by-laws of the Society.

3. It shall appoint the necessary agents, clerks, and servants of the Society, with such powers and duties, privileges and compensation as it may from time to time determine; and may at pleasure revoke such appointments, and make others in their stead.

4. It shall have power to fill, for the unexpired term, any vacancy that may occur in any of the offices of the Society.

5. It shall have power, at its discretion, to declare vacant the seat of any member of its own body (except the president and vice-presidents) who shall have been absent from its meetings for three successive months; and also by a vote of a majority of the whole Council to remove from its own body any member thereof for cause; but in such case it shall be the duty of the Council to report every such vacancy or removal to the Society, at its next stated meeting thereafter, when such cases shall be subject to review by the Society.

6. It shall not, without an approving vote of the Society at a stated meeting thereof, make any contract whereby a liability in amount above one thousand dollars may be incurred by the Society; nor

without such vote make any sale or disposition of the property of the Society exceeding that sum in value.

7. The Council may, in its discretion, remit the initiation fee or annual dues of any member of the Society.

8. No member of the Council shall receive any salary or pecuniary compensation for his services.

9. The Council shall hold stated meetings for the transaction of business at least once in every month, except the months of July, August, and September.

10. At all meetings of the Council, five members present shall constitute a quorum for the transaction of business.

CHAPTER XV.

GENERAL PROVISION AS TO DEBT.

No debt on account of the Society, beyond the funds in the treasury for its payment, shall for any purpose, at any time, be incurred; and if at any time it shall appear that there are resting upon the Society pecuniary obligations beyond the funds in the treasury for their liquidation, no appropriation of funds from the treasury whatever, except for the necessary current expenses of the Society, shall be made, until the said pecuniary obligation shall be fully discharged, or the funds necessary for their extinction shall have been set apart for that purpose.

CHAPTER XVI.

ALTERATION OF THE BY-LAWS.

No alteration in the by-laws of the Society shall be made unless openly proposed at a stated meeting of the Society, entered on the minutes, with the name of the member proposing the same, and adopted by the Society at a subsequent meeting, by a vote of two thirds of the members present.

CHAPTER XVII.

ADOPTION OF THE BY-LAWS.

The foregoing are hereby adopted and declared to be the by-laws of the Society; and all by-laws of the Society heretofore adopted are hereby rescinded and declared to be null and void.

HONORARY AND CORRESPONDING MEMBERS AND FELLOWS.

HONORARY MEMBERS.

BAKER, Sir Samuel W., F.R.S., F.R.G.S.

CONSTANTINE, the Grand Duke, President of the Imperial Russian Geographical Society, St. Petersburg.

DUFFERIN, the Earl of, Viceroy and Gov.-General of India.

ELDER, Sir Thomas, Adelaide, South Australia.

ISMAÏL, ex-Khedive of Egypt.

LAYARD, Sir Austen Henry, D.C.L.

MARKHAM, Clements R., K.C.B., Secretary of the Royal Geographical Society.

MCCLINTOCK, Admiral Sir F.L., R.N.

NARES, Sir George S., R.N., K.C.B.

NORDENSKIÖLD, Baron A. E., Stockholm.

PEDRO II., Emperor of Brazil.

RAWLINSON, Major-General Sir Henry C., K.C.B., Vice-President of the Royal Geographical Society.

CORRESPONDING MEMBERS.

ABBE, Prof. Cleveland, Washington.

AMMEN, Rear-Admiral Daniel, U.S.N., Washington.

BARTHOLOMEW, John, Edinburgh.

BREWER, Prof. Wm. H. New Haven.

BROWNLEE, HARRISON J., C.E., Manitoba.

CHAIX, Prof. Paul, Geneva, Switzerland.

GARDNER, Prof. James T., Albany.

GILLIODTS VAN SEVEREN, L., LL.D., Bruges.

GILMAN, Daniel C., LL.D., President Johns Hopkins University, Baltimore.

LANDAU, Dr. Wilhelm.

LESSEPS, Ferdinand de, Paris.

LONG, Col. C. Chaillé, Corea.

LUCE, Admiral S. B., U.S.N.

MALTE-BRUN, V. A., Paris.

MAUNOIR, Charles, Paris.

MAURY, Louis Ferdinand Alfred, Paris.

MCCARTEE, D. Bethune, M.D., New York.

NEGRI, Cristoforo, Turin.

NEY, Count Napoléon, Paris.

PACKARD, Prof. A. S., Providence, R. I.

PERALTA, Manuel M. de, Liege.

PRINCE, Hon. L. Bradford, Santa Fé, N. M.

PUMPELLY, Prof. Raphael.

RAE, John, M.D., London.

RAIMONDI, Antonio, Lima, Peru.

ROMERO, Matias, Envoy of Mexico at Washington.

SCHUYLER, Hon. Eugene.

STANLEY, Henry M.

VINCENT, Frank, Jr.

VIVIEN DE SAINT-MARTIN, Versailles.

WALKER, Gen. Francis A., Boston.

WRIGHT, Gen. Horatio G., U.S.A., Washington.

WYSE, Lt.-Com. Lucien N. B., Paris.

YOUNG, Jesse, F.R.G.S., New York.

FELLOWS.

CORRECTED TO DECEMBER 31, 1888.

Date of Election.
1859 Arnoux, Hon. William H.
1869 Auchmuty, Richard Tylden.
1871 Atterbury, Rev. Wm. W., D.D.
1872 Allen, Horatio M., S. Orange, N. J.
1873 Albert, Halpern.
1874 Alexander, Junius B.
1874 Avery, Samuel P. (L. F.)
1874 Agnew, John T. (L. F.)
1874 Allen, Henry Wilder.
1874 Amy, Henry. (L. F.)
1874 Agnew, Alexander McL.
1874 Astor, Hon. W. W. (L. F.)
1874 Appleton, D. S.
1875 Amsinck, Gustav.
1876 Appleton, Nathan, Boston, Mass.
1879 Austin, William.
1879 Agostini, Joseph.
1879 Ashley, L. Seymour.
1879 Astor, John Jacob. (L. F.)
1881 Allen, Eben S.
1881 Armour, Herman O. (L. F.)
1883 Ames, Adelbert, Highlands, N. J.
1883 Aub, Albert.
1883 Atterbury, J. T. (L. F.)
1883 Aikman, Walter M.
1883 Adams, William.
1884 Abbott, Frank, M.D.
1884 Adler, I., M.D.
1885 Agnew, Andrew G.
1885 Adams, C. H.
1885 Auchincloss, E. S.
1886 Appleton, Wm. H.
1886 Agassiz, Prof. Alex., Cambridge, Mass.
1886 Allen, Chas. Slover, M.D.
1886 Allien, Henry V.
1886 Alden, R. Percy.

Date of Election.
1886 Affleck, J. A.
1886 Avery, Rush E.
1887 Andrews, Wm. L.
1887 Alexander, Robert C.
1887 Arnold, Glover C., M.D.
1887 Archbold, John D. (L. F.)
1887 Allen, Timothy Field.
1888 Alexander, J. F.
1888 Ashwell, Thomas.

1852 Bancroft, Hon. George, (L. F.) Washington, D. C.
1852 Barney, Hiram. (L. F.)
1853 Brown, James M.
1856 Baker, Francis. (L. F.)
1859 Brown, James. (L. F.)
1859 Boorman, J. Marcus, (L. F.), Brooklyn, N. Y.
1859 Bernheimer, Isaac.
1859 Belmont, August. (L. F.)
1859 Barlow, S. L. M.
1865 Banvard, John. (L. F.)
1868 Banks, David.
1868 Beckwith, N. M.
1868 Bennett, James Gordon.
1868 Bernheimer, Adolph.
1868 Bernheimer, Simon.
1868 Brady, Hon. John R.
1869 Bailey, Jas. Mühlenberg. (L. F.)
1869 Banyer, Goldsboro.
1869 Bickmore, Prof. A. S.
1869 Bierstadt, Albert.
1870 Butler, Cyrus.
1870 Bishop, T. Alston. (L. F.)
1872 Brown, Walston H.
1873 Bailey, N. P.
1874 Bishop, D. W. (L. F.)
1874 Bien, Julius.
1874 Bartlett, Willard.
1874 Bissinger, Philip.

1874 Backus, Henry C. (L. F.)
1874 Baldwin, Townsend B., Tuxedo Park, N. Y.
1874 Barnes, John S.
1874 Bonner, Robert.
1874 Bonn, Wm. B.
1874 Barnard, Horace.
1874 Benjamin, John.
1874 Butler, William Allen.
1874 Barr, William.
1874 Belding, Milo M.
1874 Bookstaver, Hon. Henry W.
1874 Brownson, Commander W. H., U.S.N. (L. F.), Washington, D. C.
1875 Barney, Charles T.
1875 Beaman, Charles C.
1875 Bernheimer, J. A.
1875 Beckwith, Leonard F.
1875 Bedle, Hon. Jos. B., Jersey City, N. J.
1875 Beekman, Gerard.
1875 Brownell, Silas B.
1875 Barnes, William.
1875 Beste, Henry.
1875 Bredt, Ernest.
1875 Belknap, Commodore Geo. E., U. S. N., Norfolk, Va.
1875 Bowie, Augustus, J., Jr., San Francisco, Cal.
1876 Brower, John.
1876 Billings, Frederick. (L. F.)
1877 Bixby, Robert, F. (L. F.)
1877 Börs, Christian.
1877 Blanchard, George R.
1877 Blatchford, Eliphalet W., Chicago, Ill.
1878 Bliss, Cornelius N. (L. F.)
1878 Barton, Oliver Grant. (L. F.)
1878 Brown. Rev. Philip A. H.
1878 Brand, James.
1878 Brown, J. Romaine.
1879 Barattoni, C. A.
1880 Banks, D. S. (L. F.)
1881 Baldwin, Edwin.
1881 Baldwin, Christopher C.
1881 Babcock, Samuel D.
1881 Backus, Henry Landon.
1882 Bamberger, Jacob F.
1882 Belton, Frank S.
1882 Baldwin, Octavius D.
1882 Ballin, Gustav N.
1882 Bacon, Francis McNeil.
1882 Babcock, George H.
1882 Barger, Samuel F. (L. F.)
1882 Barney, Newcomb C.
1883 Bowen, Francis C.
1883 Barclay, J. Searle.
1883 Brewster, Benj. (L. F.)
1883 Bachem, C. H.
1883 Baker, Cyrus O.
1883 Beekman, Wm. B.
1883 Berry, Oliver F.
1883 Bowne, Walter. (L. F.)
1883 Banta, Theodore M.
1883 Bangs, Charles W.
1883 Barr, Edward.
1883 Bergen, Tunis G.
1883 Battell, Robbins.
1883 Bennet, Ludovic.
1883 Benedict, Robert D.
1883 Blake, Frederick D.
1883 Bell, Capt. W. R.
1883 Benson, Frank Sherman.
1884 Bentley, Henry, (L. F.) Philadelphia, Pa.
1884 Boynton, Nathaniel A.
1884 Burrall, F. A., M.D.
1884 Barton, Geo. De F.
1884 Bangs, Fletcher H.
1884 Bonner, G. T.
1884 Brookfield, William.
1884 Bassett, E. D.
1885 Bliss, George T.
1885 Burnet, Robt. W., Cincinnati, O.
1886 Barker, P. C., M.D., Morristown, N. J.
1886 Benjamin, Hon. S. G. W.
1886 Brown, Hon. Addison. (L. F.)
1886 Bridgman, E. C.

1886 Buckley, Rev. J. M., D.D.
1886 Bowne, John.
1886 Bostwick, J. A. (L. F.)
1886 Blakeman, Birdseye.
1886 Bowers, John M.
1886 Bruno, Richard M.
1886 Bettens, Edward D.
1886 Backus, J. Bayard.
1886 Bouvier, M. C.
1886 Beddall, Edward F.
1886 Berwind, Edward J.
1886 Bliss, Alex., Washington, D. C.
1886 Bond, Frank S.
1886 Beattie, John.
1887 Brown, Robt. I. (L. F.)
1887 Brightman, Horace I.
1887 Boas, Dr. Franz.
1887 Blagden, George.
1887 Biglow, Lucius H. (L. F.)
1887 Brown, Wm. C.
1887 Bodine, Mordaunt.
1887 Berrian, Charles M.
1887 Bradley, Leonard A. (L. F.)
1887 Booth, Fredk. A.
1887 Bentley, John.
1887 Braker, Conrad, Jr.
1887 Bend, George H.
1887 Belden, Josiah.
1887 Barbey, Henry I, (L. F.)
1887 Barron, John C., M.D. (L. F.)
1888 Boyesen, Prof. H. H.
1888 Bristow, Hon. Benj. H.
1888 Booker, Wm. Lane.
1888 Bogert, S. G.
1888 Berghaus, Dr. Alex.
1888 Buckham, George.
1888 Bruce, Sanders D.
1888 Bancroft, H. H., San Francisco, Cal.
1888 Burgess, John W.
1888 Brown, Wm. Smith.
1888 Ballou, Maturin.
1888 Breckinridge, Hon. Wm. C. P., Lexington, Ky.
1888 Baird, John.
1888 Bacon, Lathrop R.
1888 Bruen, Alexander J.
1888 Bogert, Henry L.
1888 Beers, M. H.
1888 Barstow, J. Whitney, M.D., Flushing, N. Y.

1852 Colton, Joseph H. (L. F.)
1855 Conkling, Col. Frederick A. (L. F.)
1856 Cooper, Hon. Edward.
1868 Catlin, N. W. Stuyvesant. (L. F.)
1868 Chapman, Joseph H.
1869 Cullum, Gen. George W., U. S. Army. (L. F.)
1870 Conklin, William A.
1872 Conklin, Eugene E. (L. F.)
1872 Crawford, Gen. S. W., U.S.A.
1872 Clark, E. V.
1874 Connery, Hon. T. B.
1874 Campbell, Allan.
1874 Church, Col. George E., London, Eng.
1874 Christern, F. W.
1874 Cockcroft, Jacob H. V.
1874 Chickering, Charles F.
1874 Comstock, Cornelius,
1874 Constable, James M.
1874 Caswell, Wm. H.
1874 Crerar, John, Chicago, Ill.
1874 Crocker, David.
1874 Crosby, Hon. J. Schuyler, Washington, D. C.
1874 Colgate, James B.
1874 Constantine, Andrew J.
1874 Conyngham, Wm. L. (L. F.)
1874 Crosby, Hiram B.
1874 Crocker, Geo. A.
1874 Chickering, George H., Boston, Mass.
1874 Carter, Oliver S., Orange, N. J.
1875 Clendenin, J. W.
1875 Cameron, Sir Roderick W. (L. F.)
1875 Cushman, W. F., M.D.
1875 Cooper, George C.

1875 Chittenden, S. B., Jr.
1876 Curtis, Benj. L.
1879 Coddington, Gilbert S. (L. F.)
1879 Caldwell, R. A., M.D.
1879 Childs, George W.,
Philadelphia, Pa.
1880 Calvin, Delano C.
1880 Cohen, Maurice S.
1880 Cormack, John A.
1880 Coverly, William.
1881 Clinton, Henry L. (L. F.)
1882 Calhoun, William.
1882 Clarkson, Banyer.
1882 Coudert, F. R., LL.D.
1882 Conkling, Rev. N. W.
1883 Clarke, Thos. C.
1883 Chapman, Henry E. (L. F.)
1883 Colbron, W. T.
1883 Chase, H. D.
1883 Clyde, W. P.
1883 Clews, Henry.
1883 Coit, George M.
1883 Candler, Flamen B.
1884 Claflin, John. (L. F.)
1884 Cook, John C.
1884 Carey, Henry T.
1884 Connor, W. E.
1884 Cummings, Geo. F.
1886 Cary, Alanson.
1886 Collyer, Rev. Robt., D.D.
1886 Conger, Clarence R.
1886 Crosby, Rev. Howard, D.D.
1886 Cooke, Henry C.
1886 Casey, Col. T. L., U.S.A.
1886 Coffin, Edmund, Jr.
1886 Church, Benjamin S.
1886 Corthell, E. L.
1886 Cornell, Chas. B., Chicago, Ill.
1886 Clarke, Stephen G.
1886 Carter, Henry C.
1886 Chace, Hon. Jonathan,
Washington, D. C.
1886 Colvin, Verplanck, Albany, N. Y.
1886 Clarke, C. C.
1886 Calder, George.
1886 Camp, Hugh N.
1886 Champney, J. Wells.
1886 Chauncey, Elihu. (L. F.)
1887 Clark, Jefferson.
1887 Cheney, Alfred C.
1887 Comstock, Anthony.
1887 Cannon, H. W.
1887 Conover, A. E.
1887 Cranitch, Wm. I. A.
1887 Curtis, Geo. Wm.
1887 Compton, A. T.
1887 Cleveland, Clement, M.D.
1888 Colgate, Abner W.
1888 Crimmins, John D.
1888 Cotheal, Alex. I. (L. F.)
1888 Crall, Leander H.
1888 Chase, George.
1888 Coutan, Adolphe R. (L. F.)
1888 Coutan, Chas. Albert. (L. F.)
1888 Clark, Alfred Corning. (L. F.)
1888 Cook, Henry H.
1888 Canda, Chas. J.
1888 Coleman, James S.
1888 Cross, Richard J.
1888 Coston, Wm. F.
1888 Chapin, Fred'k H.,
Hartford, Conn.
1888 Chrystie, Wm. F.
1888 Chisolm, George E.
1888 Cochran Wm. F. (L. F.)
1888 Clement, Percival W.

1855 Daly, Charles P., LL.D. (L. F.)
1856 Douglass, Andrew E.
1856 Dodge, Wm. E.
1856 Detmold, Wm., M.D.
1859 Dickerson, E. N.
1866 Darling, Hon. Wm. A.
1868 Dwight, Prof. Theo. W.
1868 Du Chaillu, Paul B.
1870 Davis, Alexander J. (L. F.)
1871 Daly, Hon. Joseph F.
1873 Delano, Franklin H. (L. F.)
1874 dePeyster, Gen. J. Watts. (L. F.)
1874 Dutilh, Eugene.

1874 Delafield, M. L.
1874 Dana, Charles A.
1874 Decker, John J.
1874 Del Monte, Leonardo.
1874 Du Bois, Wm. A.
1874 Davis, John G.
1874 Dalrymple, Alexander.
1874 Dunscombe, Richard T. (L. F.)
1874 Dun, R. G.
1875 Darrow, William.
1875 Davies, Julien T.
1875 Du Bois, Eugene.
1875 Davison, Charles A.
1875 de Peyster, Frederic J. (L. F.)
1875 Dommerich, L. F.
1877 Day, Henry M.
1877 Davis, Joseph Beale. (L. F.)
1878 Dana, Charles.
1878 di Cesnola, Gen. L. P.
1879 Dahlgrén, Charles B., Trenton, N. J.
1879 Dodge, George E.
1880 Deane, John H. (L. F.)
1880 Dyckman, Isaac M.
1880 Du Bois, James G.
1880 Du Bois, Frederick N.
1880 Dexter, Henry. (L. F.)
1880 Deen, William M.
1881 Davies, H. B.
1881 Docharty, Augustus T. (L. F.)
1881 Dowd, William.
1882 Dunham, George H.
1882 Dunlap, Robert. (L. F.)
1883 Donnell, E. J. (L. F.)
1883 Decker, Jos. H.
1884 Davis, Howland.
1884 Day, Henry.
1884 Donnelly, Thomas F.
1884 Dodge, Richard J.
1884 Dalley, Henry, Jr.
1884 Douglas, Jas., Jr.
1884 Drake, Jas. M.
1885 Dupré, Ovide. (L. F.)
1885 De Witt, George G., Jr.
1886 Dix, Rev. Morgan, D.D.
1886 de Lancey, Edward F.
1886 Dayton, Chas. W.
1886 Dean, David J.
1886 Drake, Chas. W.
1887 de Lima, Edward, Boston, Mass.
1887 Dickson, John.
1887 Dart, Russel.
1887 Day, Edward H.
1887 de Forest, George B.
1887 Davenport, W. F., M.D.
1887 Dodman, Alfred C.
1887 de Castro, Hector.
1887 Donald, James M.
1887 Doudge, James R. (L. F.)
1888 Davidson, Prof. Thos.
1888 Donnelly, Edward C.
1888 Dunham, James H.
1888 Drexel, A. J., Philadelphia, Pa.
1888 Drexel, Mrs. Joseph W.
1888 Davenport, Hon. Ira, (L. F.), Bath, N. Y.
1888 Dana, Richard S.
1888 Dyer, E. Tiffany.
1888 Dimpfel, Fred'k P.

1859 Evarts, Hon. William M.
1868 Emmet, Thomas Addis, M.D.
1874 Eaton, Prof. D. Cady, New Haven, Ct.
1875 Ellis John W.
1875 Eimer, Charles.
1875 Ely, Richard S.
1877 Elderkin, John.
1878 Ellis, John, M.D.
1878 Edson, Hon. Franklin.
1879 Earle, Ferdinand P.
1879 Elliott, Samuel. (L. F.)
1880 Eckert, Gen. Thomas T.
1882 Easton, Nelson S.
1882 Ellis, Wilbur Dixon.
1882 Eddy, Ulysses D.
1882 Edinger, August H.
1882 Edwards, Hon. J. Pierrepont, Bartow on the Sound, N. Y.
1882 Emerson, J. W.

1882 Emmons, John
1882 Earle, Joseph P. (L. F.)
1883 Eno, Amos F.
1883 Eyre, Maynard C.
1883 Earl, Wm. M.
1883 Emanuel, J. M.
1885 Elmore, Hon. J. Federico, Washington, D. C.
1886 Elliott, S. Lowell, S. Brooklyn, N. Y.
1886 Easton, Robt. T. B.
1886 Ellis, Geo. W.
1886 Edwards, Walter.
1887 Ely, James R.
1887 Eckert, Wm. H.
1887 Elkins, S. B.
1887 Eastman, Timothy C.
1887 Egleston, Melville.
1888 Edgecomb, Daniel W.
1888 Erben, Capt. Henry, U.S.N.
1888 Edmunds, Hon. George F., Burlington, Vt.

1854 Field, Cyrus W. (L. F.)
1856 Field, Hon. David Dudley.
1856 Field, B. H. (L. F.)
1857 Fish, Hon. Hamilton.
1860 Field, Rev. H. M.
1864 Faile, Thomas H.
1871 Fliess, Wm. M.
1873 Freedman, Hon. John J.
1874 Farragut, Loyall.
1874 Fellows, John P.
1874 Fleet, Oliver S.
1874 Fox, Austen G. (L. F.)
1875 Foulke, Rev. Thomas.
1875 Fargo, James C.
1875 Fuller, Charles D.
1875 Ford, James B.
1875 Folsom, George W.
1876 Fisk, Gen. Clinton B. (L. F.)
1879 Fellows, John R.
1879 Ferris, Robert M.
1880 French, Hon. Stephen B.
1881 Fearing, William H.

1882 Fairbanks, Leland.
1882 Fellows, Charles H.
1883 Fisher, Eustace W., M.D. (L. F.)
1884 Frazer, Alfred.
1884 Ferrer, Fermin.
1885 Frank, Elias L.
1886 Fritsch, Hon. Hugo.
1886 Fitch, Chas. E., Rochester, N. Y.
1886 Flagler, H. M. (L. F.)
1886 Fiske, A. K.
1886 Fuller, W. H.
1886 Fettretch, Joseph.
1887 Foyé, Andrew J. C.
1887 Friedrichs, E. H.
1887 Fitzgerald, Louis.
1887 Fairfax, Hamilton R.
1887 Floyd, John Gelston.
1887 Fellows, Gordon.
1888 Fish, Nicholas.
1888 Ferguson, Walton, Stamford, Conn.
1888 Ford, Hon. Melbourne H., Grand Rapids, Mich.

1856 Greenwood, Isaac J.
1857 Greene, John W., M.D. (L. F.)
1859 Griswold, George. (L. F.)
1868 Gebhard, Wm. H. (L. F.)
1868 Gerry, Elbridge T. (L. F.)
1868 Green, Andrew H.
1869 Gilbert, Clinton.
1872 Gerard, James W.
1872 Grinnell, R. M., (L. F.), Skaneateles, N. Y.
1873 Glaubensklee, Theo. G.
1874 Gunther, F. F.
1874 Gibbs, Theodore K.
1874 Gottsberger, William S.
1874 Galpen, Horace.
1877 Guleke, H. F., M.D.
1879 Graves, Arthur B. (L. F.)
1879 Gay, Joseph E.
1880 Gunning, William J., Norwalk, Ct.
1881 Gallaway, R. M.

1881 Green, George. (L. F.)
1881 Giles, John C.
1881 Grace, Hon. William R. (L. F.)
1881 Garland, James A.
1882 Gilbert, William E.
1882 Gallup, Albert.
1882 Gardiner, J. Grahame.
1883 Greenough, John. (L. F.)
1883 Gottschalk, Felix.
1883 Goodridge, John C., Jr. (L. F.)
1885 Glazier, Simon W.
1885 Gibson, George R.
1886 Gilder, R. W.
1886 Gallatin, Frederic.
1886 Gray, George.
1886 Grummon, J. Ward.
1886 Georger, Louis F.
1886 Gunther, W. H.
1886 Gunther, Franklin L.
1886 Gunther, Ernest Rudolph.
1886 Griffin, Chas. H.
1886 Godwin, Parke.
1886 Goodwin, James J. (L. F.)
1886 Grant, James.
1886 Godkin, E. L.
1887 Goodridge, Frederic.
1887 Grosvenor, Jas. B. M.
1887 Gould, George J.
1887 Gossler, Gustav H.
1887 Griswold, John N. A.
1888 Goodwin, C. Ridgely, Baltimore, Md.
1888 Goodwin Chas. S.
1888 Greene, Byron W.
1888 Gard, Anson A.
1888 Grafton, Joseph.

1856 Hewitt, Hon. Abram S.
1856 Hunt, Wilson G.
1859 Havemeyer, John C, (L. F.)
1864 Hammond, Henry B. (L. F.)
1868 Huntington, Daniel. (L. F.)
1868 Hall, Elial F.
1868 Hadden, John A. (L. F.)
1868 Hallock, Mrs. Frances.
1870 Harrison, Prof. Thomas F.
1871 Hamilton, Alexander.
1871 Hand, Clifford A.
1872 Hamersley, John W. (L. F.)
1872 Holbrook, Levi.
1873 Havemeyer, Hon. Theo. A.
1874 Havemeyer, Hector C.
1874 Hoguet, Henry L.
1874 Hurlbert, Henry A. (L. F.)
1874 Haydock, George G.
1874 Haines, John P.
1874 Hinton, John H., M.D. (L. F.)
1874 Holbrook, Edmund F.
1874 Hendricks, Edmund.
1874 Hendricks, Joshua.
1874 Hatch, Rufus.
1874 Huntington, C. P.
1874 Hunter, Capt. Edward, U.S.A., Fort Assiniboine, Mont.
1874 Hoyt, Harlow M.
1875 Houston, Col. D. C., U.S.A.
1875 Howland, Meredith.
1875 Hyde, Henry B.
1875 Harper, P. J. A.
1875 Harris, Sigmund.
1875 Hun, Leonard G., Albany, N. Y.
1876 Holt, Henry.
1876 Holman, Frank E.
1876 Hoes, Wm. M.
1876 Hatfield, J. B. T.
1878 Howe, George S.
1878 Herrman. Henry. (L. F.)
1878 Hinman, Wm. K.
1878 Hitchcock, Hiram.
1879 Hamilton, William G.
1879 Harris, Col. Robert.
1880 Hall, Hayden H., Chicago, Ill.
1880 Hickox, Charles R.
1881 Hinman, Russell, Cincinnati, O.
1881 Hoffman, Charles B.
1881 Hamilton, Robert Ray. (L. F.)
1882 Hascall, Theodore F.
1882 Higginson, James J.
1883 Hotchkiss, Horace L.
1883 Henry, Charles I.

1883 Hebert, Henry B.
1883 Howell, George R.
1883 Hyde, E. Francis.
1883 Hurry, Edmund Abdy. (L. F.)
1883 Hoyt, Alfred M. (L. F.)
1883 Hendricks, Arthur T.
1885 Hubbard, Walter, Meriden, Ct.
1885 Homer, Chas. S., Jr.
1885 Henry, Edward L.
1886 Hoe, Robert.
1886 Huidekoper, Arthur C., Meadville, Pa.
1886 Henderson, Harold G.
1886 Haldane, W. H.
1886 Hoyt, Colgate.
1886 Hoffman, Rev. Eugene A., D.D.
1886 Holt, Geo. C.
1886 Hawley, E. Judson.
1886 Hildreth, David M.
1886 Hinds, Joseph E.
1886 Hitchcock, Bradford W.
1886 Hillhouse, Thomas G.
1887 Hinchman, Walter.
1887 Hastings, Prof. Thos. S., D.D.
1887 Huntington, Geo. S., M.D.
1887 Hague, James D.
1887 Hurd, S. H., M.D., Skaneateles, N. Y.
1887 Hunker, Lieut. J. J., U.S.N.
1887 Horsford, Prof. E. N., Cambridge, Mass.
1887 Hunter, James B.
1887 Hopping, A. Howard.
1887 Hayes, Richard Somers.
1887 Howell, Theodore D.
1887 Hodgman, George F.
1887 Hill, James K.
1887 Hoadly, Hon. George.
1887 Holbrook, Edward.
1888 Henderson, John C.
1888 Hard, Anson W.
1888 Hoyt, Henry R. (L. F.)
1888 Hyde, John, Hyde Park, Ill.
1888 Hathaway, Horatio, New Bedford, Mass.
1888 Hammond, Charles E.
1888 Hayward, James W.
1888 Higley, Hon. Warren.
1888 Harbeck, Chas. T.

1859 Ireland, John B.
1874 Iselin, Adrian, Jr.
1881 Ives, Brayton. (L. F.)
1883 Ives, James M.
1886 Irving, John Treat.
1887 Isham, Charles. (L. F.)
1887 Inslee, Samuel.
1887 Ivison, David B. (L. F.)
1888 Irving, Cortlandt.

1852 Jay, Hon. John. (L. F.)
1852 Jones, John D. (L. F.)
1868 Johnson, Hezron A.
1871 Jones, Walter R. T.
1874 Judson, Wm. D.
1874 Janssen, Gerhard.
1874 Jesup, M. K. (L. F.)
1874 Jaffray, Edward S.
1874 Jenkins, Wm. L.
1874 James, D. Willis.
1874 Jameson, Joseph A.
1874 Jaffray, Robert.
1879 Jay, William.
1880 Jewett, George L.
1881 Jewett, Hugh J., Glenville, Md.
1881 Johnson, Bradish, Jr.
1882 Jasper, John.
1883 Judson, A. M.
1885 Juilliard, A. D.
1886 Janeway, Henry L., New Brunswick, N. J.
1886 Jacobi, A., M.D.
1886 Jennings, O. B.
1886 Jackson, Rev. Samuel M.
1886 Janvrin, J. E., M.D.
1887 Jenkins, Augustus S.
1888 Jones, Oliver L. (L. F.)
1888 Jeffries, W. Lloyd, Boston, Mass.
1888 Jackson, Oswald.
1888 Johnson, George F.

1888 Jarvis, S. M., Kansas City, Mo.

1869 Kelly, Eugene.
1870 Kühne, Frederick.
1872 Kendrick, Col. H. L., U.S.A.
1873 Kennan, George, Washington, D. C.
1874 King, Edward.
1874 Kearny, Joseph R.
1874 Kunhardt, Henry R.
1874 Kingsland, Wm. M. (L. F.)
1874 Kalbfleisch, Charles H.
1874 Keck, Thomas.
1876 Knauth, Percival. (L. F.)
1877 King, Clarence. (L. F.)
1878 Kernochan, James Lorillard. (L. F.)
1879 Kane, S. Nicholson.
1880 Keene, James R. (L. F.)
1881 Kennedy, John S. (L. F.)
1881 Kane, Grenville. (L. F.)
1881 Kirsch, Louis, Brooklyn, N. Y.
1882 King, Le Roy.
1882 King, George Gordon.
1882 King, Vincent C. (L. F.)
1883 Kneeland, Henry T.
1883 Klutschak, Henry W.
1883 Knapp, S. P.
1883 Kohn, Julius A.
1883 Kerr, Walter.
1883 King, D. H., Jr.
1884 Kountze, Augustus. (L. F.)
1884 Kahn, Dr. Hermann.
1885 Keane, Joseph.
1885 Knapp, Samuel T., Jr.
1885 Keppler, Rudolph. (L. F.)
1886 Kurtz, William.
1886 Kendall, Edward H.
1886 Kidder, Camillus G. (L. F.)
1886 Karner, W. J., Chicago, Ill.
1887 Knevals, Caleb B.
1887 Knudson, Morris F.
1887 Knight, George T.
1887 Kevan, William.
1887 Knox, John Jay.
1888 Kelly, Edward. (L. F.)
1888 Kissel, Gustav E.
1888 Knox, Herbert H.
1888 Kellogg, Charles, Athens, Pa.
1888 Kennedy, Harvey.
1888 Kennedy, H. Van Rensselaer.

1852 Livingston, Cambridge. (L. F.)
1857 Low, Abiel A. (L. F.)
1859 Lathers, Richard. (L. F.)
1868 Lawrence, Hon. Abraham R.
1869 Lawrence, John S. (L. F.)
1870 Loew, Hon. Frederick W.
1870 Lyman, Edward H. R.
1871 Letson, Robert S.
1871 Larremore, Richard L., LL.D.
1872 Libbey, William. (L. F.)
1874 Lauterbach, Edward.
1874 Livingston, Robert J. (L. F.)
1874 Langdon, Walter, (L. F.), Hyde Park, N. Y.
1874 Lorillard, Pierre.
1874 Livingston, Robert E.
1874 Littlejohn, James, Brooklyn, N.Y.
1874 Lawton, Walter E.
1874 Lawrence, Joseph B.
1874 Le Comte, Joseph.
1874 Lewis, Walter H.
1874 Lawson, Leonidas M.
1874 Lesher, Stephen R.
1875 Low, Hon. Seth, (L. F.)
1875 Lawrence, George N.
1876 Low, A. Augustus. (L. F.)
1878 Loubat, J. F., LL.D. (L. F.)
1878 Leon, Nestor Ponce de.
1879 Levy, Augustus H.
1880 Lang, Alexander.
1880 Lee, William H.
1881 Libbey, Prof. William, Jr.,(L.F.), Princeton, N. J.
1881 Langdon, Woodbury G. (L. F.)
1881 Little, Joseph J. (L. F.)
1881 Livermore, Edwin R.
1881 Lee, J. Bowers.
1882 Lambert, Edward.

1882 Langdon, Woodbury.
1882 Lamont, Lansing.
1882 Le Roy, Herman R.
1882 Lapham, Lewis H.
1882 Lamborn, Robert H.
1883 Lourie, J.
1883 Lummis, William.
1883 Lounsbery, R. P.
1886 Leete, C. H.
1886 Ludington, C. H. (L. F.)
1886 Lee, Wm. H. L.
1887 Lord, Daniel, Jr.
1887 Littlefield, Frederick M.
1887 Langmann, G., M.D.
1887 Lewis, James F.
1887 Lester, Henry M.
1887 Logan, Walter S.
1887 Lodge, Hon. Henry Cabot, Boston, Mass.
1887 Lovell, John W.
1887 Loomis, Alfred L., M.D.
1887 Lee, Homer.
1888 Lespinasse, George S.
1888 Lancaster, R. A.
1888 Lynch, James D. (L. F.)
1888 Lawton, James M.
1888 Lawson, James.

1853 Moore, George H. (L. F.)
1856 Monroe, Ebenezer, Southport, Ct.
1859 MacMullen, Prof. John.
1859 Morrell, Wm. H. (L. F.)
1859 Moore, Frank. (L. F.)
1863 May, Lewis.
1863 Moore, W. H. H. (L. F.)
1864 Morton, Hon. Levi P. (L. F.)
1868 Morrison, Henry.
1868 Martin, Isaac P.
1868 Marquand, Henry G. (L. F.)
1869 Moore, Henderson.
1870 Marbury, Francis F.
1872 Meyer, F. William.
1872 Marié, Peter. (L. F.)
1873 Moore, C. B.
1874 Morris, Henry L. (L. F.)
1874 Marble, Manton.
1874 Morgan, W. F.
1874 Moir, James.
1874 Morgan, J. Pierpont. (L. F.)
1874 Myers, John K., Yonkers, N. Y.
1874 McAlpin, David H.
1874 Merrall, William J. (L. F.)
1874 Moulton, Clarence F.
1875 Mitchell, Edward.
1875 Macy, Arthur C. E., Silver King, Arizona.
1875 Marcus, Arnold.
1875 Monheimer, Joseph A.
1875 Magoun, George C.
1875 Maclay, Moses B.
1875 Martin, Bradley. (L. F.)
1875 Meyer, L. H.
1875 McLanahan, Geo. William.
1876 Mitchell, W. Howard,
1877 Matsell, George W., Anamosa, Iowa.
1878 Musgrave, Thomas B. (L. F.)
1878 Mason, Lieut. T. B. M., U.S.N. (L. F.)
1879 Marshall, William I., Chicago, Ill.
1879 Mather, Frederick E.
1879 Motz, Ferdinand.
1879 Miller, John Bleecker.
1879 Monteith, James.
1880 Mills, D. O. (L. F.)
1880 Massey, Wm. M.
1882 Marquand, John P.
1882 Marsh, Caleb P.
1882 McWilliam, John.
1882 Moore, W. T.
1882 Mead, Erastus F.
1882 Markoe, F. H., M.D. (L. F.)
1883 Marvel, William D.
1883 Mackay, Donald. (L. F.)
1883 McCreery, James. (L. F.)
1883 Morgan, E. D.
1883 Mali, Charles.
1884 Moore, Joseph, Jr., (L. F.), Philadelphia, Pa.
1884 Myers, Andrew G.

1884 MacKellar, Wm. (L. F.)
1885 Mackenzie, D. E.
1885 Morison, George S.
1886 Muñoz, J. M. (L. F.)
1886 Murray, James B.
1886 Moore, John G.
1886 Moses, Raphael J., Jr.
1886 Manierre, Charles E.
1886 Miner, H. C.
1886 Macklin, John J.
1886 Morgan, N. Denison.
1886 MacFarland, James.
1887 Morgan, Wm. Fellowes. (L. F.
1887 Malcolm, William L.
1887 Mitchell, Hubbard W., M.D.
1887 Metcalfe, John T., M.D.
1887 Macy, Isaac A.
1887 McCourt, P. J., M.D.
1887 Mack, Jacob W.
1887 Mott, Alexander B., M.D.
1887 Mali, Henry W. T.
1887 Meyer, Alfred, M.D.
1887 Moulton, Franklin W.
1887 Montgomery, Warwick E.
1887 McCready, N. L.
1887 Morton, Alexander L.
1888 Marquand, Henry. (L. F.)
1888 Morgan, Rev. D. Parker.
1888 Montant, Jules A.
1888 Mason, Alex. T. (L. F.)
1888 Malcolm, Chas. E.
1888 Moss, Mrs. J. Osborne.
1888 Mayo, Dr. Wm. Starbuck.
1888 Myers, Theodore W.
1888 Milhau, Gen. John J.
1888 Mather, Samuel, Cleveland, O.
1888 Mead, Edwin, Jr.
1888 McGill, Geo. W., Riverdale-on-Hudson, N. Y.
1888 Moore, Cary W.
1888 Martin, Oswald J. (L. F.)
1888 McGee, James, Plainfield, N. J.
1888 McKeever, J. Lawrence.

1874 Newell, John, (L. F.), Chicago, Ill.
1874 Niles, William W.
1880 Nelson, William.
1882 Nisbet, John L.
1882 Naylor, Joseph.
1882 Nelson, Richard.
1883 Noble, Charles C. (L. F.)
1884 Neumoegen, B.
1884 Newberry, Dr. John S.
1885 Nelson, Rev. George Francis.
1886 Neilson, James, New Brunswick, N. J.
1886 Notman, John.
1886 Neftel, W. B., M.D. (L. F.)
1887 Neels, John N.
1887 Noyes, William C.

1874 Ottendorfer, Oswald. (L. F.)
1874 Olyphant, Robert M.
1874 Owen, Frederick N.
1875 Otterbourg, Marcus.
1875 Ottiwell, John D.
1875 O'Connor, Thomas H. (L. F.)
1875 Opdyke, William S. (L. F.)
1876 Olmstead, Dwight H.
1877 O'Gorman, Hon. Richard.
1879 O'Gorman, Richard, Jr.
1879 O'Brien, Thomas S.
1880 O'Shaughnessy, John W. (L. F.)
1881 Oakley, Henry A.
1882 Osborn, W. H. (L. F.)
1882 Openheim, Edward L.
1882 Osgood, William H.
1882 Otis, Col. Charles G., Brooklyn, N. Y.
1883 O'Donohue, Jos. J.
1886 O'Brien, Morgan J.
1887 Oldham, J. Leslie.
1887 Ogden, William B. (L. F.)
1888 Oakes, T. E., St. Paul, Minn.

1852 Poor, Henry V. (L. F.)
1855 Pierrepont, Hon. Edwards.
1857 Pyne, Percy R. (L. F.)
1859 Purser, George H.
1862 Phillips, George W.

1868 Powers, William P.
1868 Paulison, John P.
1871 Peabody, Hon. Charles A.
1872 Parish, Henry. (L. F.)
1874 Peabody, Arthur J.
1874 Penfold, William Hall.
1874 Potter, Hon. Orlando B.
1874 Pondir, John.
1874 Paris, Sherman.
1874 Porter, John K.
1874 Packer, Elisha A.
1874 Powers, George J.
1874 Pellew, Henry E., Katonah, N.Y.
1874 Prichard, William M.
1875 Prentice, W. P.
1875 Pfund, Anton.
1875 Porter, Gen. Horace.
1876 Plum, James R.
1878 Parsons, Edwin.
1880 Pinchot, James W.
1880 Powell, Wilson M.
1881 Post, Charles A.
1882 Parsons, Wm. (L. F.)
1882 Perkins, C. Lawrence.
1882 Parrish, James C. (L. F.)
1882 Pell, Wm. Cruger.
1882 Parsons, Joseph H.
1882 Percival, James H.
1882 Parsons, Samuel.
1882 Paton, John.
1882 Platt, Thos. C.
1882 Peck, Walter J.
1882 Parsons, John E.
1882 Parsons, Charles.
1882 Peck, Charles M.
1882 Parsons, Mrs. E. (L. F.)
1883 Parks, Robert H. (L. F.)
1884 Post, George B.
1884 Place, George.
1884 Purdy, John F.
1884 Plush, Dr. Samuel M., (L. F.)
Philadelphia, Pa.
1885 Post, Wm. Henry. (L. F.)
1885 Parker, George A.
1885 Planter, J. R. (L. F.)
1885 Pell, Charles E.
1886 Phoenix, Phillips. (L. F.)
1886 Pearson, Henry G.
1886 Pearsall, T. W.
1886 Pryer, Chas., New Rochelle, N.Y.
1886 Pings, Geo. H.
1886 Parris, Edward L.
1887 Phoenix, Lloyd. (L. F.)
1887 Perdicaris, Ion.
1887 Peaslee, Wyllys G.,
Dubuque, Iowa.
1887 Peters, George A., M.D.
1887 Parsons, William H.
1887 Putney, Daniel.
1887 Pearson, Frederick.
1887 Peters, Samuel T.
1887 Parsell, Henry V.
1888 Post, H. A. V.
1888 Parsons, John H.
1888 Peabody, Joseph, Boston, Mass.
1888 Perry, William A.
1888 Paine, Robert Treat, Boston, Mass.
1888 Phillips, Wm. D.
1888 Prescott, Geo. B.
1888 Paddock, Hon. A. S.,
Beatrice, Neb.

1883 Quackenbos, John D., M.D.
1883 Quinlin, Leonard G.
1885 Quinby, J. R.
1887 Quinlan, James.

1854 Rutherfurd, L. M.
1856 Randolph, Anson D. F.
1856 Remsen, William. (L. F.)
1856 Riker, John H.
1861 Rogers, C. B. (L. F.)
1868 Raven, Anton A. (L. F.)
1868 Rose, Cornelius.
1872 Robbins, Chandler. (L. F.)
1874 Reid, Whitelaw.
1874 Richard, Auguste. (L. F.)
1874 Rogers, H. Livingston.
1874 Riker, William J.
1874 Reynes, Jaime

1874 Rhoades, John H.
1875 Roosevelt, Clinton.
1875 Read, Gen. Meredith., (L. F.)
Paris, France.
1875 Rose, Charles.
1876 Ross, William B.
1877 Rice, A. Thorndike.
1878 Roorbach, Orville A.
1878 Rainey, Thomas, M.D.,
Ravenswood, N. Y.
1879 Rhinelander, Miss J. (L. F.)
1880 Robinson, Mrs. John A. (L. F.)
1881 Randolph, J. C. F.
1881 Robbins, George A.
1881 Rhinelander, Frederick W.
1882 Rinehart, E.
1882 Ray, James D.
1882 Robbins, S. H.
1882 Redding, W. E.
1882 Rolston, Roswell G.
1882 Rhinelander, Charles E.
1882 Rathborne, C. L.
1883 Rosenbaum, Albert S.
1883 Richardson, Briton.
1883 Rowland, Thomas F. (L. F.)
1886 Raymond, R. W.
1886 Roys, Geo. B.
1886 Rice, Isaac L. (L. F.)
1886 Ransom, Rastus S.
1886 Rogers, Belden J.
1887 Remsen, Robert Geo. (L. F.)
1887 Ruggles, James Francis.
1887 Robertson, R. H.
1887 Robb, Hon. J. Hampden. (L. F.)
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1887 Rowell, Geo. P. (L. F.)
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1887 Robertson, T. S., M.D.
1888 Russell, Henry E.
1888 Riker, Daniel S.
1888 Roe, Alfred
1888 Ropes, Chas. H.
1888 Rhinelander, Wm.
1888 Renwick Edward S.
1888 Richter, Dr. C. M.,
San Francisco, Cal
1888 Russell, Hon. John E.,
Leicester, Mass.
1888 Robinson, Wm. M.
1888 Reiley, Robt. T.

1856 Spofford, Paul N.
1856 Schermerhorn, Wm. C.
1856 Sherman, W. Watts.
1859 Schultz, John H. (L. F.)
1860 Stout, Francis A. (L. F.)
1869 Strebeigh, Robert M.
1870 Sherwood John.
1870 Schafer, Samuel M.
1870 Schafer, Simon.
1870 Seligman, James.
1870 Seligman, Jesse.
1871 Shaler, Gen. Alexander.
Ridgefield, N. J.
1871 Swan, William H.
1872 Stern, Myer.
1872 Steiger, E.
1872 Stuyvesant, Rutherfurd. (L. F.)
1873 Sturges, Frederick.
1873 Spencer, James C.
1873 Scott, Julian. (L. F.)
Plainfield, N. J.
1873 Southworth, Alvan S. (L. F.)
1873 Sturgis, Frank K. (L. S.)
1874 Sands, Henry M.
1874 Steinway, William.
1874 Sloan, Samuel.
1874 Schermerhorn, F. Augustus.
(L. F.)
1874 Stuyvesant, Robert R.
1874 Stuart, Joseph.
1874 Strong, W. L. (L. F,)
1874 Steward, D. Jackson.
1874 Shethar, Samuel,
1874 Schieffelin, Samuel B.
1874 Stillwell, Benjamin M.
1874 Sawyer, Warren, Boston, Mass.
1874 Sands, Andrew H.
1874 Schaus, William.

1874 Spinney, Joseph S.
1874 Striker, J. A.
1875 Stanford, William H.
1875 Smith, Lewis Bayard.
1875 Sturges, Henry C.
1875 Stewart, Col. Charles Seaforth, Cooperstown, N. Y.
1875 Schultz, Carl H.
1875 Sandford, Elliott. (L. F.)
1875 Stranahan, J. S. T., Brooklyn, N. Y.
1875 Schieffelin, H. Maunsell.
1875 Schiff, Jacob H. (L. F.)
1875 Smith, Augustine.
1876 Smith, Harsen H.
1876 Sibley, Hiram W. (L. F.)
1876 Spaulding, Henry F.
1876 Stryker, Gen. William S., Trenton, N. J.
1876 Stone, Andros B., Chicago, Ill.
1877 Shearman, William P. (L. F.)
1877 Sanford, Gen. Henry S., Birmingham, Ct.
1877 Sanger, Major Joseph P., U.S.A., Governor's Island, N. Y.
1877 Schaff, Rev. Philip, D.D.
1877 Schuyler, Philip.
1878 Stewart, William Rhinelander.
1878 Sands, William R. (L. F.)
1878 Smith, S. Newton.
1878 Sabla, Theodore de Jolv de.
1879 Stone, R. C.
1879 Stevens, Frederic W. (L. F.)
1879 Smith, E. Reuel. (L. F.)
1879 Smith, Herbert H., Brooklyn, N. Y.
1879 Shields, Prof. Charles W., Princeton, N. J.
1879 Stetson, Francis Lynde.
1879 Squires, Grant.
1880 Southwick, Henry K. (L. F.)
1882 Sass, Dr. Luis F.
1882 Schuyler, Spencer D. (L. F.)
1882 Samson, Felix.
1882 Sayre, Lewis A., M.D. (L. F.)
1882 Scott, George S.
1882 Skidmore, Wm. L.
1882 St. John W. P.
1882 Scribner, Charles.
1883 Schermerhorn, Charles A.
1883 Simpson, George E.
1883 Stone, Sumner R.
1883 Sinclair, John. (L. F.)
1883 Spence, Lewis H.
1883 Smith, William Alex.
1883 Smith, Henry N.
1883 Stern, Louis.
1883 Schwenniger, Rev. Anton B.
1883 Sanger, Wm. Cary.
1883 Scott, Rufus L.
1883 Sorzano, Julio F.
1883 Spicer, Elihu, Jr. (L. F.)
1884 Schley, J. Montfort, M.D.
1884 Schwatka, Lieut. F., Rock Island, Ill.
1884 Shannon, Robert H.
1884 Stokes, James.
1885 Storer, Albert.
1885 Sturgis, Russell.
1885 Slote, Henry L.
1885 Stanton, S. Franklin.
1885 Storm, Walton.
1885 Schmelzel, Wm. R.
1886 Stevens, Rev. C. Ellis, LL.D.
1886 Sherman, Prof. O. T., Baltimore, Md.
1886 Sherman, George.
1886 Schuyler, Geo. L.
1886 Starr, Egbert.
1886 Satterlee, F. Le Roy, M.D.
1886 Sturgis, F. R., M.D.
1886 Smith, Edwin B.
1886 Snead, Thomas L.
1887 Stewart, Lispenard.
1887 Sutton, Rev. J. Ford, D.D.
1887 Schell, Robert.
1887 Seessel, A., M.D.
1887 Swain, George F., Passaic, N. J.
1887 Sawyer, Lieut. J. Estcourt, Governor's Island, N. Y

1887 Seligman, Dewitt J.
1887 Smith, Jas. Rufus.
1887 Smith, Nathaniel S.
1887 Sellew, T. G.
1887 Satterthwaite, Thos. E., M.D.
1887 Stetson, George W. (L. F.)
1887 Satterlee, S. K.
1887 Sterry, George E.
1887 Shortall, John G., Chicago, Ill.
1887 Serrell, Gen. Edward W.
1887 Stickney, Austin.
1887 Stevens, George T,
1888 Stephens, Benjamin.
1888 Stickney, Albert.
1888 Stuart, Inglis.
1888 Smith, Nelson,
1888 Sprague, Henry E.
1888 Salisbury, Stephen, (L. F.), Worcester, Mass.
1888 Smith, A. Cary.
1888 Stott, Frank H., (L. F.), Stottville, N. Y.
1888 Starbuck, Wm. H.
1888 Smythe, Rev. Hugh.
1888 Sheldon, Edwin B., Chicago, Ill.
1888 Schell, Edward.
1888 Skiddy, Wm. W., Stamford, Conn.
1888 Shipman, Charles M., Jersey City.
1888 Sherman, Charles A.
1888 Shultze, John S.
1888 Sturgis, Robert.

1856 Tiffany, Charles L.
1856 Townsend, Randolph W.
1868 Taylor, Douglas.
1870 Tuckerman, Lucius.
1870 Thomson, James.
1872 Tower, Gen. Z. B., U.S.A.
1874 Thompson, David G. (L. F.)
1874 Tiemann, Peter C.
1874 Trevor, John B.
1874 Taylor, Alfred J.
1874 Turner, Herbert B.
1875 Taintor, Charles M.
1875 Terry, Gen. Alfred H., U.S.A.
1875 Toel, William.
1875 Terbell, Henry S.
1876 Terry, Rev. Roderick.
1877 Tillinghast, William H.
1877 Talcott, James. (L. F.)
1879 Turnbull, Robert J., Morristown, N. J.
1880 Tailer, William H.
1881 Thompson, R. H., Troy, N. Y.
1882 Thurber, H. K.
1882 Taber, Henry M. (L. F.)
1882 Thomson, Eugene.
1882 Tailer, Edward N. (L. F.)
1882 Terry, John T. (L. F.)
1882 Taintor, Giles E.
1883 Twombly, Hamilton McK.
1883 Trumbull, Rev. H. Clay, D.D., Philadelphia, Pa.
1883 Thalmann, Ernest.
1883 Terry, Edmund.
1884 Taltavall, Wm. A.
1884 Turner, J. Spencer.
1884 Thoron, Joseph.
1885 Tone, T. Wolfe.
1885 Tiffany, Rev. C. C., D.D.
1885 Turnure, Lawrence.
1886 Thorne, Jonathan.
1887 Turnbull, William.
1887 Tower, David A.
1887 Talbot, Charles, N.
1887 Ten Eyck, Sandford R.
1887 Talmadge, Henry.
1887 Thompson, Frederic F. (L. F.)
1887 Townsend, Howard.
1888 Taber, Horace M.
1888 Thompson, W. Gilman, M.D.
1888 Twombly, Horatio N.
1888 Tompkins, Wm. W.
1888 Tresidder, John R.
1888 Taylor, C. Fayette, M.D.

1884 Utter, Dr. Francis A.
1888 Uhl, Edward. (L. F.)

1854 Viele, Gen. Egbert L.
1868 Van Santvoord, C.
1870 Van Brunt, Hon. Charles H. (L. F.)
1874 Van Rensselaer, Kiliaen.
1875 Van Buren, John D.
1875 Valentine, Lawson.
1875 Von Post, H. C. (L. F.)
1875 Vanderpoel, A. Ernest.
1876 Van Hoesen, Hon. George M.
1876 Van Brunt, Cornelius.
1877 Vanderbilt, Cornelius. (L. F.)
1878 Vanderbilt, William K. (L. F.)
1880 von Hesse, Christian.
1881 Vantine, A. A.
1883 Van Sinderen, Adrian.
1884 Van Siclen, Geo. W.
1885 Valentine, Henry C.
1886 Valenzuela, Enrique.
1887 Voorhees, Charles H., M.D., New Brunswick, N. J.
1887 Van Alen, J. J. (L. F.)
1887 Van Slyck, Geo. W. (L. F.)
1887 Verastigui, Alberto, Havana, Cuba.
1887 Voorhees, Philip R.
1888 Villard, Henry.
1888 Ver Planck, Wm. G.
1888 Vail, Theodore N.

1854 Webb, William H.
1854 Witthaus, G. H. (L. F.)
1866 Wendell, Jacob. (L. F.)
1868 White, Alexander M.
1870 Webster, Sidney.
1870 Wilson, Gen. Jas. Grant. (L. F.)
1870 Wright, E. Kellogg.
1870 Ward, T. W.
1872 Wetmore, Wm. Boerum, (L. F.) Shelburne, Vt.
1872 Wells, Jacob.
1873 Wiener, Joseph, M.D., (L. F.)
1874 Weyman, Charles S.
1874 Wheeler, Everett P.
1874 Wetmore, Hon. George P. (L. F.)
1874 Walraven, Ira E., Philadelphia, Pa.
1875 Work, J. Henry.
1875 White, Charles Trumbull.
1875 Wilcox, Franklin A.
1875 White, David, Ft. Montgomery, N. Y.
1875 Winslow, Gen. Edward F.
1875 Whitehead, Comdr. Wm., U.S.N.
1875 White, Loomis L.
1876 Wedemeyer, A. J. D.
1877 Ward, W. S., Denver, Colo.
1877 Waters, James T.
1877 Woodruff, Col. D., U.S.A., Trenton, N. J.
1878 Whitehead, Henry M.
1878 Whittemore, Charles.
1879 Watson, Francis A. (L. F.)
1879 Williams, Richard P.
1880 Wilson, James.
1881 Wilson, John.
1881 Whitehouse, Frederic Cope.
1882 Wadsworth, John H.
1882 Waddingham, Wilson. (L. F.)
1882 Williams, David. (L. F.)
1882 Winthrop, Robert. (L. F.)
1883 Wilson, Theodore.
1884 Wheelwright, Wm. D.
1884 Watson, George H. (L. F.)
1884 Wood, Wm. H. S.
1884 Walcott, Joseph C.
1886 Wright, Wm. Phillips.
1886 Walsh, Richard M. L.
1886 White, S. V. (L. F.)
1886 Wiman, Erastus.
1886 Walker, John A.
1886 Willets, Edward B.
1886 Whitehouse, J. H.
1886 White, Horace.
1886 Wales, Salem H.
1886 Watson, Wm. P.
1886 Ward, John E.
1887 White, Julian LeRoy.
1887 White, William Aug.
1887 White, Alfred T.
1887 Wilson, J. Wall.
1887 Wheelock, George G., M.D.

1887 White, Andrew J.
1887 White, Henry, London, Eng.
1887 Whitely, James.
1887 Wilcox, Stephen.
1887 Wisner, William H.
1887 Westcott, Clarence L.
1887 Welling, W. Brenton.
1888 West, Hon. George,
Ballston Spa, N. Y.
1888 Whitehouse, W. Fitzhugh.
1888 Wynkoop, Francis S.
1888 Walsh, F. Y.
1888 Witherbee, Frank S.
1888 Wynkoop, G. H., M.D.
1888 West, Frederick T.
1888 Woodward, Jas. T. (L. F.)
1888 Wendell, Ten Eyck.
1888 Worthington, Robt. H.
1888 Wood, Charles B.
1888 Wolfe, Dr. S. B.
1888 Wetmore, Edmund.
1888 Winslow, Daniel.

1874 Young, Mason.
1888 Young, Edward F. C.,
Jersey City, N. J.

1875 Zollikoffer Oscar.
1884 Zabriskie, Andrew C. (L. F.)
1886 Zucker, Alfred.

FELLOWS DECEASED, 1888.

Chas. G. Havens, Jan. 7.
Theo. Houston, Jan. 13.
Chas. A. Decker, Jan. 28.
John Green, Jan. 30.
Romaine Dillon, Feb. 4.
Geo. W. Cass, March 21.
Chief-Justice M. R. Waite, March 23.
David D. Acker, March 23.
Hon. John T. Hoffman, March 24.
Joseph W. Drexel, March 25.
Henry E. Pierrepont, March 28.
Gen. Q. A. Gillmore, U.S.A., April 7.
Geo. H. Jones, April 14.
Wm. B. Dinsmore, April 20.
John B. Dash, May 11.
Chas. T. Wing, May 24.
Lieut.-Comdr. Geo. M. Totten, U.S.N.
T. Garrett Harrison, June 8.
Col. T. Bailey Myers, June 16.
Courtlandt Palmer, July 23.
Christopher Meyer, July 31.
I. N. Phelps, Aug. 1.
Wm. H. Inman, Aug. 19.
Rich'd A. Elmer, Oct. 1.
Francis W. Williams, Oct. 8.
John Savage, Oct. 10.
A. Wright Sanford, Oct, 19.
Chas. H. Phillips, Oct. 29.
L. J. N. Stark, Nov. 6.
Frederic A. Potts, Nov. 9.
Erastus T. Tefft, Nov. 10.
John H. Kneeland, Nov. 13.
Admiral C. H. Baldwin, U.S.N.,
Nov. 17
John Elliott, Dec. 5.
Edward S. Dakin, Dec. 6.
Townsend Smith, Dec. 23.
August Aufermann.

List of Foreign and Domestic Geographical and other Scientific Bodies with which this Society is in Communication and Constant Exchange of Publications.

ALASKA:

Alaskan Society of Natural History and Ethnology, Sitka.

ARGENTINE REPUBLIC:

Academia Nacional de Ciencias, Córdoba
Instituto Geográfico Argentino, Buenos-Aires.
Instituto Histórico-Geográfico del Rio de la Plata, Buenos-Aires.
Sociedad Geográfica Argentina, Buenos-Aires.

AUSTRALIA:

Department of Mines, Sydney, N. S. W.
Linnean Society of New South Wales, Sydney, N. S. W.
Royal Society of New South Wales, Sydney, N. S. W.
Royal Society of Queensland, Brisbane, Queensland.
Melbourne Observatory, Melbourne, Victoria.
Royal Society of Victoria, Melbourne, Victoria.

AUSTRIA:

Ferdinandeum, Innsbruck.
Gesellschaft der Wissenschaften, Prague.
K. K. Akademie der Wissenschaften, Vienna,
K. K. Geographische Gesellschaft, Vienna.
K. K. Geolog. Reichsanstalt, Vienna.
K. K. Naturhist: Hofmuseum, Vienna.
K. K. Militär-Geographisches Institut, Vienna.

BELGIUM:

Société Belge de Géographie, Antwerp.
Académie Royale de Belgique, Brussels.
Institut National de Géographie, Brussels.
Le Mouvement Géographique, Brussels.
Société Royale Belge de Géographie, Brussels.

BRAZIL:

Bibliotheca Nacional, Rio de Janeiro.
Instituto Historico, Geographico, e Ethnographico do Brazil, Rio de Janeiro.
Museu Nacional, Rio de Janeiro.
Observatorio, Rio de Janeiro.
Secção da Sociedade de Geographia de Lisboa no Brazil, Rio de Janeiro.
Sociedade de Geographia, Rio de Janeiro.

CALIFORNIA:

Academy of Sciences, San Francisco.
Geographical Society of the Pacific, San Francisco.
Mercantile Library Association, San Francisco.
California Historical Society, Berkeley.
University of California, Berkeley.

CANADA:
- Hamilton Association, Hamilton, Ontario.
- Geological and Natural History Survey of Canada, Ottawa.
- Royal Society of Canada, Ottawa.
- Geographical Society, Quebec.
- Literary and Historical Society, Quebec.
- Canadian Institute, Toronto.

CHILI:
- Der Deutsche Wissenschaftliche Verein, Santiago.
- Observatorio Astronómico, Santiago.
- Oficina Central de Estadística, Santiago.

CHINA:
- China Branch of the Royal Asiatic Society, Shanghai.
- Statistical Department, Inspectorate-General Imp. Maritime Customs, Shanghai.

CONNECTICUT:
- Connecticut Academy of Arts and Sciences, New Haven.
- Library of Yale University, New Haven.
- Ferguson Library, Stamford.

DENMARK:
- Royal Danish Academy of Sciences, Copenhagen.
- Royal Danish Geographical Society, Copenhagen.
- Society of Northern Antiquaries, Copenhagen.

DISTRICT OF COLUMBIA:
- Philosophical Society, Washington.
- Smithsonian Institution, Washington.

EGYPT:
- Société Khédiviale de Géographie, Cairo.

ENGLAND:
- Royal Cornwall Polytechnic Society, Falmouth.
- Literary and Philosophical Society, Liverpool.
- Royal Asiatic Society, London.
- Royal Geographical Society, London.
- Royal Society, London.
- Meteorological Office, London.
- British Association for the Advancement of Science.
- Statistical Society, London.
- Victoria Institute, London.
- Literary and Philosophical Society, Manchester.
- Manchester Geographical Society, Manchester.
- Statistical Society, Manchester.
- Royal Geological Society, Penzance.
- Yorkshire Philosophical Society, York.

FRANCE:
- Société Académique de Maine-et-Loire, Angers.

Société de Géographie Commerciale, Bordeaux.
Société des Sciences Naturelles, Cherbourg.
Union Géographique du Nord de la France, Douai.
Société de Géographie Commerciale, Havre.
Société de Géographie, Lille.
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Société Languedocienne de Géographie, Montpellier.
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Société de Géographie, Tours.
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GERMANY:

Deutscher Kolonialverein, Berlin.
Gesellschaft für allgem. Erdkunde, Berlin.
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Verein für Erdkunde, Darmstadt.
Verein für Erdkunde, Dresden.
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Verein für Geog. und Statistik, Frankfurt-a-M.
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INDIA:

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INDIANA:

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IOWA:

Academy of Natural Sciences, Davenport.
Historical Society, Iowa City.

IRELAND:

Natural History and Philosophical Society, Belfast.
Royal Dublin Society, Dublin.

ITALY:

Sez. Fiorentina della Società Africana, Florence.
R. Biblioteca Naz. Centrale, Florence.
Società d'Esplorazione Commerciale, Milan.
Società Africana d'Italia, Naples.
Biblioteca Nazionale Centrale Vittorio Emanuele, Rome.
Società Geografica Italiana, Rome.
Società di Geog. ed Etnografia, Turin.

JAPAN:

Asiatic Society, Yokohama.
Geographical Society, Tokyo.
Imperial University of Japan, Tokyo.
Seismological Society, Tokyo.

JAVA:

Bataviaasch Genootschap van Kunsten en Wetenschappen, Batavia.

MARYLAND:

Naval Institute, Annapolis.

MASSACHUSETTS:

Appalachian Mountain Club, Boston.
Boston Society of Natural Sciences, Boston.
Peabody Museum, Cambridge.
State Library, Boston.
Library of Harvard University, Cambridge.
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American Association for the Advancement of Science, Salem.
Essex Institute, Salem.

Peabody Academy of Science, Salem.
American Antiquarian Society, Worcester.
Society of Antiquity, Worcester.

MEXICO:
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Observatorio Meteorol. Magn. Central, Mexico.
Sociedad Mexicana de Geografía y Estadística, Mexico.

MICHIGAN:
Public Library, Detroit.

MINNESOTA:
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Minnesota Historical Society, St. Paul.

MISSOURI:
Academy of Sciences, St. Louis.

NEBRASKA:
State Historical Society, Lincoln.

NETHERLANDS:
Aardrijks. Genootschap, Amsterdam.
K. Instituut voor de Taal- L- en V-van Nederlandsch-Indië, The Hague.
Nederlandsch Meteor. Instituut, Utrecht.

NEW YORK:
State Museum of Natural History, Albany.
Long Island Historical Society, Brooklyn.
Society of Natural Sciences, Buffalo.
Academy of Sciences, New York.
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New York Linnean Society, New York.
Vassar Brothers Institute, Poughkeepsie.
Oneida Historical Society, Utica.
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Am. Museum of Nat. History, New York.

NEW ZEALAND:
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NORWAY:
Royal University, Christiania.

OHIO:
Cincinnati Society of Natural History, Cincinnati.
Western Reserve and Northern Ohio Historical Society, Cleveland.

PENNSYLVANIA:
Academy of Natural Sciences, Philadelphia.
Second Geological Survey of Pennsylvania, Philadelphia.
Historical and Geological Society of Wyoming, Wilkesbarre.
Franklin Institute, Philadelphia.

PORTUGAL:
- Academia Real das Sciencias, Lisbon.
- Commissão Central Permanente de Geographia, Lisbon.
- Sociedade de Geographia, Lisbon.

ROUMANIA:
- Societatea Geog. Română, Bucharest.

RUSSIA:
- Société des Naturalistes de la Nouvelle Russie, Odessa.
- Orenburg Section of the Imp. Rus. Geog. Society, Orenburg.
- Imperial Russian Geographical Society, St. Petersburg.
- Caucasian Section of the Imp. Russ. Geog. Society, Tiflis.

SCOTLAND:
- Geological Society, Edinburgh.
- Royal Society, Edinburgh.
- Scottish Geographical Society, Edinburgh.
- Philosophical Society, Glasgow.

SPAIN:
- Sociedad Española de Geografía Comercial, Madrid.
- Sociedad Geográfica, Madrid.

SWEDEN:
- Society for Anthropology and Geography, Stockholm.
- Société Royale des Sciences, Upsal.
- University of Lund, Lund.

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Deuxième Campagne Scientifique de l' *Hirondelle*, Paris, 1887; Sur une Expérience entreprise pour, etc., 2^{me} Camp. de l' *Hirondelle*, Paris, 1887; Sur les Résultats Partiels des deux Campagnes, etc., Paris, 1887; Sur la Troisième Campagne de l' *Hirondelle*, Paris, 1887; Sur des Courbes Barométriques, Paris, 1887.

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From the Trustees of the Brooklyn Library, Brooklyn, N. Y.:

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Fourth Annual Report of the Commissioners, (for 1887) Troy, N. Y., 1888.

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Annual Reports, 1883–1886, Albany, 1884–1886.

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Jahrbuch für Bremische Statistik, Bremen, 1888.

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Twenty-eighth Annual Meeting of the Am. Numismatic and Archæological Society (1886), New York, 1886.

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Photograph of a Painting, "The Highest North of All Time."

From F. W. Putnam, Author:

Palæolithic Man in Eastern and Central North America, by F. W. Putnam, Cambridge, Mass., 1888.

From the Rev. Geo. E. Post, Author:

Botanical Geography of Syria and Palestine, London, n. d.

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El Canal Interoceánico de Nicaragua y Costa Rica, Bruselas, 1887.

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Annual Report of the Geological Survey of Pennsylvania for 1886, Part III; and 3 Atlases to do., Harrisburg, 1887–1888; Annual Report Pt. IV, for 1886, and Atlas, Harrisburg, 1887; North Anthracite Coal Field, Pt. II, Harrisburg, 1888; Atlas of E. Middle Anthracite Field, Pt. II, Philadelphia, 1888.

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Report of Pennsylvania State College for 1886, Harrisburg, 1887; Report of Secretary for Internal Affairs, Pt. IV, Harrisburg, 1887; Report of Superintendent of Public Instruction, for 1887, Harrisburg, 1887; Report on Soldiers' Orphans, Harrisburg, 1887: Reports on Banks and Savings Institutions, Harrisburg, 1887; Report of Adjutant General, 1887, Harrisburg, 1888; Report on Agriculture, 1887, Harrisburg, 1888; Report of Auditor General, 1887, Harrisburg, 1888; Report of State Treasurer, 1887, Harrisburg, 1888; Report on Sinking Fund, 1887, Harrisburg, 1887; Report on Railroads and Canals, Pt. IV, 1887, Harrisburgh, 1888; Report of Insurance Commissioner on Fire Insurance, 1887, and on Life, 1887, Harrisburg, 1888 ; Report on Industrial Statistics, 1887, Harrisburg, 1888; Report on Board of Charities, 1887, Harrisburg, 1888; Compendium of Laws Relating to Health, Harrisburg, 1888; Smull's Legislative Handbook, 1888, Harrisburg 1888; Report of the Inspectors of Mines, 1887, Harrisburg, 1888.

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From Dr. Robert Sieger, Author, Vienna:

Schwankungen der innerafrikanischen Seen, Wien, n. d.: Schwankungen der hocharmenischen Seen, Wien, 1888.

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Report of the Commissioner of Crown Lands for the Province of Quebec, for 1885, Quebec, 1885; Map of the Dominion of Canada and part of the United States, Montreal 1883; Map of Lac St. Jean; Framed Photograph of Lake Nicaragua and line of Proposed Canal.

From Mr. James Stevenson, Author, Glasgow, Scotland:

The Arabs in Central Africa: Glasgow, 1888; Map of the Country between Lakes Nyassa and Tanganyika, London (Map by Ravenstein).

From the University of Lund, Sweden:

Sveriges Offentlige Bibliotek: Accession-Katalog, Stockholm, 1888.

From the Swedish Government:

118 Statistical Documents, Commercial, Industrial, Financial and Legislative, 1887–1888.

From Mr. J. B. Tyrrell, Toronto, Author:

Brief Narrative of the Journeys of David Thompson, Toronto, 1888.

From the State Board of Health, Nashville, Tennessee:

Bulletin, Vol. III., Nos. 1–12; Vol. IV., Nos. 1, 3, 4, 5.

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Twenty-third Annual Catalogue of Vassar College, 1887–1888, Poughkeepsie, N. Y., 1888.

From M. Vivien de St. Martin, Paris:

Nouveau Dictionnaire de Géographie Universelle, Livr. 41.

From Van Antwerp, Bragg & Co., Cincinnati, Ohio:

The Eclectic Physical Geography, by Russell Hinman, Cincinnati, 1888.

From Gen. Egbert L. Viele:

Digest of International Law of the United States, etc., by Francis Wharton, LL.D., 3 vols., Washington, 1886.

From Mr. F. Cope Whitehouse, Author, London:

The Raiyān Reservoir (reprint from *Engineering*, Sept. 14 and 21), London, 1888.

From the Wisconsin State Historical Society, Madison, Wisconsin:

Catalogue of the Library of the Wisconsin State Historical Society, Vol. VII. (Fifth Supplement), Madison, Wisconsin, 1887;

Wisconsin Historical Collections, Vols. X. and XI., and Index, Vols. I.–X., Madison, 1888.

From Mr. J. W. Wells, New York:

Mapa del Rio Putumayo, Brazil.

From the Superintendent of the U. S. Coast and Geodetic Survey, Washington, D. C.:

Catalogue of Charts and other Publications of the Coast Survey, Washington, 1887.

From the Smithsonian Institution, Washington, D. C.:

Smithsonian Miscellaneous Collections, Vols. 31, 32, 33, Washington, 1888; Report of Regents for 1885, Part II.; Washington, 1886.

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Reports of the Director of the Mint for the years 1876, 1878, 1881–1883, 1885–1887, 8 vols., Washington, D. C.; Reports on Production of Precious Metals for the years 1880, 1883–1886, 5 vols., Washington, D. C.

From the U. S. Land Office, Washington, D. C.:

Reports of the U. S. Land Office for the years 1877–1879, 1881–1887, (in all 10 vols.) Washington, D. C.

From the Navy Department, Washington:

Annual Report of the Smithsonian Institution for 1885, 2 vols., Washington, 1886; Fisheries and Fishery Industries, Section II., Washington, 1887.

From the Superintendent of the Naval Observatory, Washington:

The American Ephemeris and Nautical Almanac for 1891, Washington, 1888.

From the Superintendent of the Nautical Almanac, Washington, D. C.:

Report of the Superintendent of the Nautical Almanac to June 30, 1887.

From the Chief Signal Officer, Washington, D. C.:

Annual Report of Chief Signal Officer, Washington, 1886.

From the Attorney-General of the United States, Washington, D. C.:

Reports of the Attorney-General of the United States for the years 1886 and 1887, Washington, D. C., 1886–1887.

From the U. S. Hydrographic Office, Washington, D. C.:

Sailing Directions for the Indian Ocean, No. 85, Washington,

D. C., 1887; Monthly Pilot Charts of the North Atlantic for 1888, with 2 Supplements; Limits under Fishery Treaties, 1818 and 1888; Navigation of the Caribbean Sea and the Gulf of Mexico, Vol. I., No. 86; Charts: No. 1059, Port du Moule, Gaudeloupe, No. 1010, Island of Barbadoes, 1058 Christiansted Harbor, Santa Cruz Island, 1065, Port Louis, Guadeloupe, 1046 Todos Santos Bay, Lower California, 1062 Coche Island Anchorage, Venezuela, 1043 San Quentin Bay, W. Coast Lower California, 1056 St. Pierre Harbor, Island St. Pierre, 1071 S. Atlantic Ocean, 1082 Galet Anchorage, Gaudeloupe-Désirade, 1061 Sydney, Cape Breton, 1060 Punta Arenas Anchorage, W. Coast Costa Rica, 1084, Lagoon Head Anchorage, W. Coast Lower California, 1069 Beaver Harbor, Nova Scotia, 1085 Rosario Bay and Sacramento Reef, W. Coast Lower California, 1018 Burica Point to Morro Puercos, W. Coast Central America, 968 N. E. Coast of Guiana, 1074 Canso Harbor, Nova Scotia, 1064 La Trinité Bay, Martinique, 1073 Saint François Anchorage, Gaudeloupe, 1066 Gulf of St. Lawrence and Prince Edward Island, 1076 Pictou Harbor, Gulf of St. Lawrence, 1079 Port Hood, Cape Breton, 1086 Chart of Sainte Anne Anchorage, Guadeloupe, 1008, Aspinwall, U. S. of Colombia, 1072 Chinchorro Bank, Honduras, 1087 Estanques Bay, Venezuela, 1088 Newfoundland, Fortune Bay, Harbor Breton, 1090 Gaultois and Picarré Harbors, Newfoundland, Hermitage Bay, 1089 Lamalin Anchorages, S. Coast Newfoundland, 1067 Bay of Chaleurs and Adj. Coasts, Gulf of St. Lawrence, 1075 Guysborough Harbour, Nova Scotia, 1077 Cardigan Bay, Pr. Edward's Island, Gulf of St. Lawrence, 1091 Cow Head Harbor and White Rock Bay, W. Coast Newfoundland, 1092, Magdalen Islands, Gulf of St. Lawrence, 1080 Bedeque Harbor, Pr. Edward's Island, Gulf of St. Lawrence, 1093 Despair Bay, Great Jervis Harbor, Newfoundland, 1078 Twillingate (Toulinguet) Harbors, Newfoundland, 1094 Pugwash Harbor, Nova Scotia, No. 94 Fangaloa Bay, Island of Upolu, Samoan Group, 1096 Hilo Bay, Hawaii, 1068 Hillsborough Bay, Prince Edward Island, Crapaud Road, Pr. Edward Island, 1097 Scatari Island and Menadou Passage, Cape Breton Island, 1013 Gulf of St. Lawrence, 1098 Amet Sound and Anchorages, Nova Scotia, 1099 Merigonish Harbor, Nova Scotia, 1100 Santa Rosalia Bay, W. Coast Lower California, 1113 Port Nelson, Rum Cay, Bahama Islands, 1107 Amherst Harbor and Grand Entry Harbor, Magdalen Islands, 1115 Blanca and Falsa Bays, W. Coast Lower California.

From the Director of the U. S. Geological Survey, Washington, D. C.:

Mineral Resources of the United States for 1886, Washington, 1887; First and Second Annual Reports of the U. S. Geological Survey, Washington, 1880–1882.

From the Chief of Engineers, U. S. Army, Washington, D. C.:

Annual Report for 1886, Parts I, II, III, Washington, D. C., 1886; Annual Report for 1887, Parts I–IV, Washington, D. C., 1887.

From the Bureau of Education, Washington, D. C.:

Report of the Commissioner of Education, 1885–1886, Washington, 1887.

From the Bureau of Ethnology, Washington, D. C.:

Bibliography of the Eskimo Language, by J. C. Pilling, Washington, 1887; Bibliography of the Siouan Languages, by J. C. Pilling, Washington, 1887; The Use of Gold and Other Metals in Chiriqui, by William H. Holmes, Washington, 1887; Work of Mound Exploration of the Bureau, by Cyrus Thomas, Washington, 1887; Perforated Stones from California, by Henry W. Henshaw, Washington, 1887.

PART I.

TRANSACTIONS
OF
THE SOCIETY FOR THE YEAR
1888.

TRANSACTIONS OF THE SOCIETY FOR 1888.

Annual meeting of the American Geographical Society, held at Chickering Hall, Tuesday, January 10, 1888, at 8 o'clock, P.M.

President Daly in the chair, until the delivery of the address, when his place was taken by Vice-President Egbert L. Viele.

On motion, duly seconded, it was voted to dispense with the reading of the minutes of the previous meeting.

The following gentlemen were elected Fellows:

Dr. A. Berghaus, John D. Crimmins, Frank S. Witherbee, Anson W. Hard, Henry Villard, John W. Burgess, Benjamin Stephens, Edward C. Donnelly, Alexander I. Cotheal, Sanders D. Bruce, Richard A. Elmer, G. H. Wynkoop, M.D., H. H. Bancroft, A. W. Colgate, Henry Marquand, Wm. Lane Booker, Albert Stickney Nicholas Fish, George Buckham, George Chase, Frederick T. West, Henry E. Russell, A. J. Drexel, S. G. Bogert, J. F. Alexander, Geo. F. Lespinasse, Prof. Thos. Davidson, Prof. H. H. Boyesen, Rev. D. Parker Morgan, Daniel W. Edgecomb, Hon. Benj. H. Bristow, John H. Parsons, Alexander T. Mason, John C. Henderson, Adolphe R. Coutan, H. A. V. Post, T. Harrison Garrett, Jas. T. Woodward, Byron W. Greene, C. Ridgely Goodwin, Jules A. Montant, Oliver L. Jones, Henry R. Hoyt, Edward Kelly, Leander H. Crall, Charles Albert Coutan.

The annual report of the Council was then presented, and read by Mr. William Remsen:

New York, January 10, 1888. Since the last annual report there have been held six regular meetings of the Society and nine stated and eight special meetings of the Council.

At the annual meeting of the Society on the 11th of January, 1887, the distinguished English Naturalist, Mr. Alfred Russel Wallace, delivered a lecture on "Oceanic Islands: their Physical and Biological Relations."

On the 21st of February, the Hon. Clarence Pullen delivered a lecture on "New Mexico: Its Geography, Scenes and Peoples."

On the 15th of March, Mr. F. S. Dellenbaugh gave an account of his "Exploration of the Grand Cañon of the Colorado."

On the 15th of April, the Rev. Francis Brown delivered a lecture on "Recent Explorations in Egypt."

On the 20th of October, Dr. Franz Boas read a paper on "A Year with the Eskimos."

On the 23d of November, Dr Eustace W. Fisher read a paper on "India."

On the 14th of December, Prof. F. A. Ober delivered an address on "The Ancient Cities of America and the Evidences of Early Civilization."

All these lectures were illustrated with stereopticon views.

During the year the volumes of the Journal for the years 1885 and 1886 were completed and distributed to the Fellows and to the various Societies and Institutions, at home and abroad, which exchange publications with the Society. The quarterly Bulletins have also been issued with regularity.

The additions to the Library and Map Room number 2299, viz: Books 224, Atlases 3, Maps and Charts 175, and Pamphlets (including Serials) 1897.

The annual report of the Treasurer, Mr. Walter R. T. Jones, shows a balance to the credit of the General Fund of $823.18.

The Council feels itself justified by the facts in congratulating the Society upon the steadily increasing prosperity manifested in all its departments and upon the growing recognition in America and elsewhere of its long-sustained efforts in the cause of geography.

WILLIAM REMSEN,
Chairman of Council.

The Nominating Committee then presented the following report:

To the American Geographical Society:

The Nominating Committee, appointed to select officers to fill vacancies—under resolutions of the Society, passed at its meeting, December 14, 1887—respectfully report the selection of the following nominees for election in accordance with Chapter V, Section 2, of the By-Laws:

For President — Charles P. Daly, LL.D., term to expire January, 1889.

For Vice-President — Gen. Geo. W. Cullum, U. S. Army, term to expire January, 1891.

Gen. Egbert L. Viele, term to expire January, 1889.

For Foreign Corresponding Secretary — Prof. Wm. Libbey, Jr., term to expire January, 1891.

For Treasurer — Walter R. T. Jones, term to expire January, 1889.

For Councillors — W. H. H. Moore, Isaac Bernheimer, Orlando B. Potter, D. O. Mills and Admiral C. H. Baldwin, U. S. Navy, terms to expire January, 1891.

Levi Holbrook, term to expire January, 1889.

Luther R. Marsh, term to expire January, 1890.

N. P. BAILEY, *Chairman*,
CLINTON ROOSEVELT,
CHARLES A. PEABODY,
Nominating Committee.

On motion of Judge C. A. Peabody, duly seconded, Mr. John A. Hadden was appointed to cast the vote of the Society for the nominees, and they were then declared duly elected.

The President, Ex-Chief-Justice Daly, then delivered an address on the "Recent Geographical Work of the World." The address was illustrated by large maps and by a number of stereopticon views.

At the close of the address a vote of thanks to the President, moved by Dr. Eustace W. Fisher, was duly seconded and unanimously passed.

The Society, on motion, adjourned.

Meeting of February 15, held at Chickering Hall.

President Daly in the chair.

The reading of the minutes of the last meeting was dispensed with.

The following candidates, recommended by the Council, were elected Fellows of the Society:

Herbert H. Knox, Wm. Smith Brown, Charles E. Malcolm, James H. Dunham, W. Gilman Thompson, M.D., Mrs. J. O. Moss, John Hyde, Daniel S. Riker, Alfred Corning Clark, Nelson Smith, Stephen Salisbury, Charles H. Ropes, Ten Eyck Wendell, Gustav E. Kissel, R. A. Lancaster, Henry Stanton, Inglis Stuart, Henry H. Cook, Wm. G. Ver Planck, Charles J. Canda, Henry E. Sprague, Alfred Roe, James D. Lynch.

The President then spoke of the loss sustained by the Society, and more peculiarly by himself, in the recent death of the Foreign Corresponding Secretary, James Carson Brevoort. The close association of many years had enabled President Daly to appreciate better than most men the kindly personal qualities and gifts as well as the rare scholarship of Mr. Brevoort. The post left vacant by his death had been filled by the election of Prof. Wm. Libbey, Jr., of Princeton College, where he held the chair of Physical Geography, formerly occupied by Arnold Guyot. The President then introduced Prof. Libbey, who read a lecture on "Moscow."

At the close of the lecture the Society, on motion, adjourned.

Meeting of March 29, held at Chickering Hall.

Vice-President GEO. W. CULLUM in the Chair.

The reading of the minutes of the previous meeting was, on motion, omitted.

The following gentlemen, recommended by the Council, were elected Fellows of the Society:

Gen. John J. Milhau, Richard J. Cross, Wm. W. Tompkins, Robert H. Worthington, Robert Treat Paine, James Lawson, Maturin Ballou, Dr. Wm. Starbuck Mayo, Edward S. Renwick, A. Cary Smith, Walton Ferguson, Wm. H. Starbuck, Oswald Jackson, Joseph Peabody, T. F. Oakes, James S. Coleman, Wm. A. Perry, Horace M. Taber, Chas. B. Wood, Wm. Rhinelander, Horatio N. Twombly, John R. Tresidder, Theo. W. Myers, Frank H. Stott, Horatio Hathaway, W. Lloyd Jeffries, Theo. N. Vail, Wm. F. Coston, Charles Kellogg, James M. Lawton.

Gen. Egbert L. Viele then read the following Resolutions, which were unanimously adopted:

Resolved, That in the death of Joseph W. Drexel, a Fellow of this Society since 1876, and for the past five years a Member of its Council, the American Geographical Society has sustained a loss not easily repaired. His association with the aims and objects of the Society was a natural outcome of the intelligence and liberal culture as well as of the genuine and active benevolence and humanity, which made him a centre of good influences in the community;

Resolved, That this Society extends its heartfelt sympathy to the afflicted family of the deceased, and that a copy of these Resolutions be transmitted to them by the Secretary.

Gen. Viele then announced the death of Henry E. Pierrepont, one of the earliest Members of the Society, and offered the following Resolutions, which were unanimously adopted:

Resolved, That in the death of Henry E. Pierrepont, one of the Founders of this Society, and for ten years, from 1852 to 1862, a Member of its Council, the American Geographical Society has met with an irreparable loss. When there was little but the sense of duty to bring the members together, Mr. Pierrepont, whatever might be the inclemency of the weather or the other seeming obstacles in the way, travelled from his distant home to take part in the work of the Society. The interest thus manifested in the early days he continued to show to the end of his unsullied life;

Resolved, That this Society sympathizes profoundly with the afflicted family of the deceased, and that a copy of these Resolutions be transmitted to them by the Secretary.

Vice-President Cullum then introduced the speaker of the evening, the Hon. Clarence Pullen, who delivered a lecture on the "City of Mexico."

At the close of the lecture, the Society, on motion, adjourned.

Meeting of April 25, held at Chickering Hall.

President DALY in the chair.

It was voted to dispense with the reading of the minutes of the last meeting.

The following candidates, recommended by the Council, were elected Fellows of the Society:

Harvey Kennedy, Edwin Mead, Mrs. Joseph W. Drexel, Samuel Mather, Edward Schell.

President Daly then introduced Mr. F. S. Dellenbaugh, who delivered a lecture on "Finistère: the Artist's Corner of Brittany."

At the close of the lecture the Society, on motion, adjourned.

Meeting of November 13, held at Chickering Hall.

President DALY in the chair.

It was, on motion, decided to omit the reading of the minutes of the last meeting.

The following candidates, recommended by the Council, were elected Fellows of the Society:

Rev. Hugh Smythe, Edmund Wetmore, Daniel Winslow, Edwin B. Sheldon, Townsend Smith, Geo. F. Johnson, Fred'k H. Chapin, Dr. C. M. Richter, William D. Phillips, Hon. Warren Higley, Chas. E. Hammond, Dr. S. B. Wolfe, Chas. S. Goodwin, Geo. W. McGill, Chas. M. Shipman, Dr. J. Whitney Barstow, James W. Hayward, Ed. F. C. Young, Cary W. Moore, Anson A. Gard.

The President then introduced the speaker, Gen. Jas. Harrison Wilson, who read a paper on "China and Its Progress."

At the close of the lecture the Society, on motion, adjourned.

Meeting of December 18, held at Chickering Hall.

President DALY in the chair.

On motion, it was resolved to dispense with the reading of the minutes of the previous meeting.

The following persons, who were recommended by the Council, were elected Fellows of the Society:

Capt. Henry Erben, U.S.N., Hon. Geo. F. Edmunds, Hon. Melbourne H. Ford, Hon. John E. Russell, Hon. Wm. C. P. Breckinridge, Wm. F. Chrystie, Joseph Grafton, E. Tiffany Dyer, John Baird, George E. Chisolm, Wm. F. Cochran, Oswald J. Martin, Wm. W. Skiddy, Charles A. Sherman, James McGee, Edward Uhl, W. Fitzhugh Whitehouse, Robert T. Reiley, Hon. Ira Davenport, Cortlandt Irving, Richard S. Dana, Thomas Ashwell, Lathrop R. Bacon, Hon. George West, Percival W. Clement, Fred'k P. Dimpfel, George B. Prescott, William M. Robinson, H. Van Rensselaer Kennedy, Hon. A. S. Paddock, John S. Schultze, Chas. T. Harbeck, C., Fayette Taylor, M.D., Alexander J. Bruen, S. M. Jarvis, Henry L. Bogert, F. G. Walsh, Francis S. Wynkoop, J. Lawrence McKeever, Robert Sturgis, M. H. Beers.

On motion of Dr. Eustace W. Fisher, duly seconded, the President was requested to appoint a Committee of Three to nominate Officers and Members of the Council to be elected at the Annual Meeting, to be held on the 15th of January, 1889.

The President then introduced Prof. Wm. H. Brewer, of Yale University, who read a lecture entitled, "A Contribution to the History of the Great Basin, west of the Rocky Mountains."

At the close of the lecture, the President announced the names of the Committee of Three, appointed in accordance with the request of the Society, as follows: Messrs. N. P. Bailey, Clinton Roosevelt and Chas. A. Peabody.

On motion, the Society adjourned.

PART II.

PAPERS READ

AND CONTRIBUTED TO

THE SOCIETY DURING 1888.

Note.—The Authors alone are Responsible for the Contents of their Respective Papers.

BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY.

Vol. XXVII **1895.** **No. 1**

KOREA AND THE KOREANS: IN THE MIRROR OF THEIR LANGUAGE AND HISTORY.

A LECTURE BY

WM. ELLIOT GRIFFIS, D.D.

(Author of "Korea, the Hermit Nation.")

LADIES AND GENTLEMEN: The lecture on Korea and the Koreans, to which you are to listen this evening, is not a narrative of personal adventure. Let me at once state the fact that I have never, on foot or horse, in flesh and blood, been inside the boundaries of the Peninsular Kingdom. My explorations have been in the history, language and art of this people and country, which stand between China and Japan, supplying the link of relationship in the chain of "the three countries." What I tell you to-night consists of the answers which I have received in talking to living Koreans in the United States and Japan, and even more by inquiring of those who have been dead ages or decades ago. Most of my notes have been taken while exploring that great treasure house of thought, that gallery of photographs of mind which has been slowly formed in the evolution of the centuries,—the Korean language.

Doubtless this confession will be a source of disappointment to some of you. Yet, when I read the latest books on Korea and the Koreans and articles just damp from the press, and when I peruse the letters of visitors to or correspondents living in Seoul, and find so little of real information, I am not so much dissatisfied with my own method of inquiry. When I see in the tourists' publications pictures made by and bought from the native artists, which the foreigner does not at all understand, I feel that his text is far below the pictures, and that old records and word-photographs are not to be despised. The tourist and traveller, on foot or pony's back, gives his *impressions*, but these do not and cannot explain the people or their life, or show, for example, the causes of the singular political and moral weakness of the Koreans, who are physically among the finest peoples in Eastern Asia. To the passing visitor, also, the national art, religion, beliefs and literature, are as sealed scrolls. What astonishes me in the new books and letters from Korea (for the scholar and long resident has not yet written) is the vast amount of darkness that still enswathes the tiny lanterns which the travellers seem to carry. Nevertheless, let us be thankful for such light as we can get.

When, however, we question the ancient and mediæval records, when we hold up the mirror of language, when we study Korean art, we see how one explains the other, and each throws light on all. Though we may never have lived in the land of clean clothes and filthy habits, or walked in the undrained streets, or stumbled along the alleged roads, we may get, within certain limits, a few clear ideas about Korea and the Koreans. Such ideas as I have obtained you will allow me to present before you this evening, to be further illustrated by the stereopticon pictures made from photographs taken on the soil, or from genuine objects of native art.

As in married life, when one man and one woman have lived together in love and harmony during many years, they come to look like each other, so a people long dwelling upon the soil of a country resemble in temperament and character the land they inhabit. In a true marriage between country and people there grows up a likeness, and there is found a subtle harmony which is not easily disturbed. So true is this, that it is next to impossible for a new man from Christendom to penetrate the motives or forecast the action of the eastern Asiatics. Captain Sherard Osborn, R. N., when asked what a Chinaman would do in a certain case, answered: "Make up your mind as to how an Englishman might act under the circumstances, and then consider that a Chinaman would do exactly the opposite." Whether we are willing to acknowledge it or not, climate, soil, air, food, and all natural influences combining with hereditary bias, make the man what he is in spite of himself at the moment. It is only when the impact of ideas from without is further re-enforced by powerful mental initiative and a determined will that the old crust of ideas and routine is upheaved and broken through. Something like this has already happened in Japan; something like this (while we are waiting to see it fully manifested) has probably already begun in Korea.

This marriage between people and country and the subtle likeness and harmony thereby produced are manifest at once in the case of the Hebrews and Palestine; in that of the Arabs in the deserts or cities; as between the Dutch and their dyke-land; and in the instance of Japan and her people. The student of the languages and history of these peoples feels this harmony of nature and man as keenly as does the lover of music when skilful player and well-attuned instrument come together.

In no country, more than in Korea, is the image of the character of the people in the mirror of their language and history more clear. The great landmarks of nature are reflected in the national temperament with a sharpness of outline like that of mountain peaks upon the unruffled surface of the lake within the crater-bosom. A study of that language in its details enables us to read therein the main features of Korean history. Even had we not the literary records before us, we could construct in bold outlines and in rich coloring the national story. Furthermore, a knowledge of history gives the key to art. A survey of the records explains in great measure the awful poverty of the people, their backwardness in civilization, and the fact, which to my mind seems undoubted, that the Korea of to-day is a retrogression from the Korea of the Middle Ages, and that her civilization was greater a semi-millennium ago than in the year 1894. In this latter year, the Old Korea of isolation, degradation and hermit-like seclusion, passed away, while the New Korea of independence, nobler development, and a world-touching national life began A. D. 1895.

Looking into the mirror of language as read not only in the literature, so far as we know it, but especially in the geographical names, in the proverbs and idioms of the people, and in the rich vocabulary of the language, as set forth by Japanese, French, English and American scholars, we see looming up the great political influences, the natural landmarks, the creatures of earth, air and water, and the invisible influences which shape belief. We see that in origin the people of this peninsula are made up of many races, which in the early and unwritten ages struggled for mastery. Here is the picture which language gives: men out of the north, living under feudal forms of government in the great plains and valleys of Manchuria, gradually move southward. They have in these early eras very much the same domestic animals that are found to-day south of the Ever White Mountains. The pig, besides being a favorite source of food, furnishes also the material for cosmetics. The horse is rather a pony, reminding one more of a

Newfoundland dog than a Normandy beast of draught. The serpent is a creature both honoured and worshipped. The tiger is the great enemy, mightily influential both in reality and in imagination, but also the educator of man in valour and vigilance. The love of dancing, music and hilarity is strong. Etiquette, rude though it be, is as important for the dead as for the living. Banners, bells and gongs please the eye and ear.

Then rises the vast looming shadow of China. Toward the setting sun is a great and mighty Power,—a State in which there are not only cities and cultivated farms, the riches of a long civilization, but books and learning. There are also mighty men of culture, and their intellectual keenness and penetration surprise the rude people among whom, as trader, voyager, colonist, or political master, the Chinaman comes. At some time in the remote past (the Koreans and Chinese both claiming the date to be as early as 1122 B. C.) one of the ancestors of Confucius, Ki-shi, comes into a region which included within its sphere of influence a portion of what is now northern Korea, and thus the people were brought into direct contact with Chinese letters and civilization. Although the modern critical student refuses to accept as real history the traditions which the Koreans possess of this alleged founder of their social order, yet it is interesting to find throughout the region of Ping Yang, in the land-measures, in the customs of daily life, in the impress upon common speech, upon geographical names, and above all in the graven stone tablets, so many memorials of this Ki-Shi.

Twice the Chinese overran Korea and made conquest of the region north of the Ta-Tong River and west of the great mountain range. In the second century B. C., and again in the seventh century they conquered the region at this moment occupied by the Japanese armies and also the northwestern part of the Korean peninsula. From this latter century Chinese influence has been predominant throughout the north, especially, but also over the whole country. Roughly speaking, we may say that the northern half of Korea is in its language, ideas and procedure, strongly leavened with the Chinese civilization. Throughout all the national history there has been a strong element, often taking form in what might be called a political party, that has ever sought to cultivate the closest relations with the Middle Kingdom. The influence of China during the Tang and Sung dynastic eras was so close and powerful, that its impress on the native speech, language, literature and art of Korea is manifest at a glance.

On the other hand, there has always been in Korean politics a tendency toward more or less complete independence,—political, social and even literary. Roughly speaking, southern Korea is Japanese, or at least far more Japanese than Chinese in language, ideas and procedure; for the relations between the peninsula and the archipelago have been very close. Though sober criticism does not allow that the Japanese, in any true sense of the word, ever conquered all Korea, though research shrivels up into Lilliputian proportions the Brobdignagian story of the "conquest of Korea" by the Amazonian Empress, Jingu, yet it is evident that in the early Christian ages, if not before, the Japan Islands were peopled largely by a race of Asiatic highlanders who came from various parts of the Korean peninsula. Beside a very liberal amount of fighting at home among themselves, these islanders and peninsulars both enjoyed a good deal of warfare against each other on both land and water.

Exactly what a "pirate" is, or rather was, is not laid down in either the written or unwritten law of ancient times; but it is certain that the Japanese raid into Korea partook more of the nature of piracy than of devotion to science, or missionary zeal. Throughout the early centuries there was a pretty constant succession of expeditions from Japan into the peninsula, very much like those which are so frequent in the early history of Britain, when the Danes, Frisians, and that miscellaneous mass of Low Dutch people called "Anglo-Saxons" landed in England. Nevertheless the Japanese never overran Korea, or held the whole country, except once, and then only for a few months, in the great invasions of 1592–1597. Forced to retire southward before the combined armies of China and Korea, they remained for many months at points near the sea-coast, leaving their mark especially in the southern provinces. When finally they departed, they seem to have scooped the country clean of its art, its movable riches, and in general of its skilled artisans. While the Japanese thus left Korea blasted and barren, they enriched themselves and entered upon that splendid development of artistic and literary culture, which, after two and one-half centuries of assiduous care within, as it were, a walled garden, has burst into the full flower which surprises the world. After the Japanese came the Manchus, and poor Korea, made poorer and ground under an abominable system of government, has been a pauper among nations and the prey of at least two of them.

The mirror of language reflects in large proportion these constant political influences, the major from China, the minor from Japan.

History also tells us that beside these nationalities, various tribes and people out of the periodically-overflowing plains of Manchuria, and once the great hordes of the Mongols from the far north-west penetrated the peninsula, leaving more or less deposit of ideas and blood. Even the Arabs came and traded at the Korean ports. During the Japanese invasion, Portuguese also entered the country. In the seventeenth century two companies of Dutchmen, shipwrecked on the shores, lived inside of the peninsula during many years. From time to time the flotsam and drift from many lands found a lodgment on Korean shores. It is very certain that in this once hermit nation there is a mixture of many bloods. Almost every traveller has called attention to what I noticed immediately when meeting the Koreans who came to ratify the first treaty,—that there are several distinct ethnic types. Besides the dark-skinned labourers with "pudding faces" of uncultured aboriginal stock, the high-cheeked Manchu face, the round, plump features of the Chinese in the centre and north, and the figures and countenances closely resembling the Japanese in the south, the traveller is surprised at seeing faces of a pronounced Caucasian type. The thought of Aryan or at least Indian intermixture is more than a suggestion, when the undoubted affinities between the Dravidian languages of southern India and the speech of Korea are remembered. While there is a large Chinese vocabulary (which, however, does not affect the syntax of the language), and while in structure, the Korean and Japanese are so much alike, as to suggest twin brothers that were once hardly distinguishable infants lying in the same cradle, yet this subtle resemblance between the ancient languages of India and the speech of Korea is more than accident.

The Korean language, in its vocabulary and idioms once exotic but now part of the garden of daily speech, and in a phraseology that is varied and striking, bears witness also to the great religious and civilizing influences that came in with Buddhism. This great civilizer advanced by a double path from both Tibet and China; it came also at different times and in various forms. The earliest missionaries brought the rudiments of simple Buddhism in the literary and doctrinal forms of what is called the Smaller Vehicle. History tells us this was as early as the fourth century. But from the seventh to the fourteenth centuries we can trace the importations of new fashions in doctrine, ritual and Buddhistic literature, which show also that the Koreans came to enjoy the grander outlook and the more fascinating splendours of the Larger Vehicle, with its brilliancy of imagination and captivating rhetoric.

Roughly outlining the history of the imported Indian faith, we may say that from the fourth until about the eleventh century, there was the missionary age of Korean Buddhism. Then, from that time until the end of the fourteenth century, we have its golden age of success, prosperity and mighty power. This is the era of mighty monasteries and nunneries, of splendid temples, when Sanskrit was studied; when more or less native literature was produced; when the living rock in mountain and boulder was sculptured into the forms of Buddhas, Bodhisattvas and saints; and when a knowledge of Buddhism penetrated even to the common people. For, one of the grandest inventions ever achieved in Korea was that of a true vernacular alphabet, one of the most perfect in the world, and founded not only on thoroughly rational but on accurately phonetic and linguistic principles. This alphabet of twenty-five letters—eleven vowels and fourteen consonants—enabled even the common people to read and write; while from Korea into Japan flowed a constant stream of missionary and civilizing influences. In Japanese Buddhistic literature, Korea is "the Treasure-Land of the West."

In these halcyon days of Korean Buddhism pilgrims went clear beyond the Himalayas to visit the holy land of the faith and to bring back sutras, images and relics; while, on the other hand, pious pilgrims from India, "the land nearest Heaven," were received in great state at Sunto, which was then the Korean capital. Then, the site of the present Seoul contained, indeed, a city; yet not of lay dwellings, but of monasteries and nunneries, where thousands of monks daily chanted the sacred sutras and shastras. This capital of mediæval Korean Buddhism had, as documents say, a "myriad and nine" temples. There still stands, solitary and unhonoured, in Seoul, a white marble pagoda, once richly sculptured, now defaced, and rising from surroundings of squalor. It is the eloquent witness to the scholar of the bygone days of a once national religion. The most striking monuments of art and of the old religion are the *mir-yeks* or "stone men." Throughout the country, sometimes rising out of a plain in a mass of white granite that reminds one of a lighthouse; sometimes at the edge or on the spur of a mountain range, lichened and mossy with centuries of neglect; sometimes found even in forests and claiming kindred of oblivion with the giant trees that for centuries have not felt the axeman's touch, are the colossal sculptured figures of Buddha. These images, which, though occasionally in pairs and representing the dual, or male and female principles which Chinese philosophy sees dominating the universe, were reared by Buddhists. The most ancient or male image is that of the Maitreya or Messiah Buddha—the Buddha to come. The second or female figure has been, in each case, probably added much later, after the prevalence of Confucianism. By and bye Buddhism, instead of being, as at first, an aggressive missionary force, resolutely conquering its way by faith and sacrifice, lifting up a light to guide and inspire, and becoming the Salvation Army for the lowly and the ignorant, waxed fat and gross with kingly favor and royal patronage. Then its decay began. It was already dead, of atrophy of the intellect and fatty degeneration of the heart, even before the sword of the soldier, to the charge of treason, added decapitation. Buddhism was, as a system, in 1392, not only disestablished but it utterly waned as an intellectual and moral power. Seoul, the city of monasteries, was obliterated as such and made the royal residence and capital. It is less "the Paris" than the Hague of Korea, since the name means literally, the hedge or palisade. The priests were prohibited from entering walled cities and were reduced to a sort of clerical militia, who held their monasteries and garrisoned fortresses at the king's pleasure. Their very existence depended upon their subservience and cringing obedience.

Nevertheless it must not be forgotten that the awful poverty and devastation which Buddhism in the peninsula to-day shows, was in considerable measure the result of the Japanese torch and hammer. For to the war of 1592–97 there was added not only the bitterness of the hostile invader, but also the iconoclastic bigotry of the Japanese Christians who so numerously composed the invading army and took their cue from friars who looked to Philip II. of Spain as a shining Christian example. Steeped in ignorance and cut off from all vitalizing touch with their fellow-religionists, the priests of Korean Buddhism have sunk to the lowest degree of what may, in a strain of exaggeration, be called religion.

The average Korean's religiosity is one that is made up of a mixture of the Confucian ethics, the dregs of Buddhism, and, more than either, the indigenous demonolatry. Fetichism, with its charms, amulets and spells, rules from the palace to the rice field. Shamanism, with its crowds of geomancers, horoscopists, fortune-tellers, locators and removers of tombs, and answerers of questions to the gullible, is omnipresent and rampant. Even their distance-posts or boundary-figures are carved into grotesque resemblances to the human face and head, with probably a Shamanistic reference to the land spirits. From the Ever-White mountain to the island of Quelpart, the poor superstitious people are constantly under the tyranny of those who pretend to propitiate the spirits of earth, air and water, and the myriads of invisible beings that jostle each other in their chronic determination to work harm to mortals. In no country is there a larger menagerie of mythical zoölogy. In the region of water beneath there is every sort of dragon and of malevolent, slimy or scaly creatures such as no naturalist has ever yet captured for his museum. Besides the tiger, the serpent and the various specimens of hoofed, horned, clawed, beaked and winged creatures of reality, there is every imaginable specimen of mythical composite. The scars on the Korean imagination are long and deep. The student is constantly reminded of the oriental proverb, "Blow away the hair and you find a gash." The missionary, with his belief in one true God, must rout these hosts of darkness; but the man of science must be his companion and aid. Already in Japan the church and the school-house have perceptibly removed the incubi and driven off the nightmares. What Korea wants is the same light and truth which, in place of the *delirium tremens* of Paganism, will bring health, wealth, strength and soberness.

Dominant through all the ages, since its first introduction in the early Christian centuries, has been the Chinese ethical system. This furnishes the Korean with his daily rules of conduct. It is interesting to note the philosophical and doctrinal evolutions of Confucianism. In Korea, as well as in its old home, China, and in Japan, Confucianism was first a simple system of ethics built upon the etiquette of the ancestral sacrifices; but, as cogitated and manipulated by the Chinese schoolmen of the Middle Ages, it became a remarkable philosophical system, in some phases agnostic, but in its general trend pantheistic. In Japan, Confucianism has had remarkable local developments and adaptations, which have changed it at some points very strikingly as compared with the Chinese norm and forms. In Korea this system of ethics and metaphysics has been developed noticeably by critical students and commentators, so that it is among certain learned classes, "a pantheistic medley"; but with the Koreans generally it may be said that Confucianism, besides furnishing ethics and philosophy and a substitute for religion, as we understand it, has become a system of political economy. It may be safely said that though differing widely in both method and object, the struggles, during the past decade, of the anti-Japanese and anti-progressive party of the Min clan at court, and those of the Tong Hak (Eastern Culture) rebels in the south, are based on the same ideas. The former sought to get and keep all political power, office and spoils. The self-styled Tong-Haks, or Eastern Civilization Party of insurgents, whose uprising (through the necessity of military force to subdue it) brought on the present war, believe in the old order of things. Both the Min nobles and the Tong-Hak peasants are ultra-Confucianists, who have sought to prevent the modernization of Korea by a fresh assertion of the Chinese ethical system as they understand it.

These importations of religion and of political influences from Japan and China have been as so many new horizons widening the Korean vision and giving it new range. Yet besides things political and religious, let us glance at some of the great elements in social and material progress which language and history reveal. It was a great gift to human comfort when cotton was introduced into the peninsula, furnishing a new material for dress and even for the armor of the soldier. Thus far, the Koreans have preferred to wear the woven material in its undyed form. The unique spectacle is presented of a whole nation dressed in white, and of people looking as though night had been turned into day and somnambulists had not yet exchanged their sleeping clothes for the garb of work and of outdoors. This bleached costume is but an index of the attitude of the people at large who are still asleep or in dreams, while all around them the world has awakened. Even the Chinaman who visits the streets of Seoul sees in the fashions of dressing both the hair and the body the mirror of customs long abandoned in China.

Less certain in its benefits to the Korean people was the introduction of tobacco, through the Portuguese, Spaniards and Japanese of the sixteenth century. To the habitual and temperate user of tobacco, no doubt, any world which knew not the soothing influence of this weed, must have been a dark one; and to the holder of such a creed the advent of tobacco seems like the discovery of a new continent of physical pleasure. However this may be (the lecturer being personally heterodox on this subject) the Korean eschewing, but not chewing, the leaf in its solid form, nor inhaling it in powder, clings to the use of the weed in the pipe alone. As in his own dwelling he builds a *kang* or system of flues extending laterally from end to end, having a furnace at one end and a chimney at the other, through which smoke and heat pass, so the male human being makes a *kang* of himself. About four feet from his mouth he builds a tiny brass furnace which he charges with fuel from the tobacco plant. At the other end, he pulls most industriously in order to make a draft, using his mouth and nose as bellows and chimney. The quantity of tobacco which the average male will get through with is prodigious. The favorite attitude of the smoker is the squat, his face having a peculiarly vacant expression during his absorption in this Nirvana of smoke. Furthermore, his teeth which are usually strong and white are made the machinery by which he supports the weight of the long cane stem, tipped as it sometimes is with jade. When not making a chimney of himself, he thrusts his pipe down his back behind the collar; or, if he is a soldier, he uses his Remington, Winchester or fire-lock for a pipe case.

The Korean dress has no pocket in it, neither has it any buttons inside or out. It is kept together with strings or by the mere force of gravity. Whatever receptacles may equip the person, for the keeping of official commissions, seals, the provender for smoke, tools, money, or what not, are in the form of bags suspended from the waist. While outwardly, the clothes may be white, in the case of the upper classes, and of an uncertain tint which hovers around or approaches gray, in that of the lower classes, inwardly the Korean is not quite as "all glorious" as the king's daughter. The Korean language, to say nothing of reality, suggests neither soap nor lye, nor is there a simple word, as in Japanese, meaning hot water or bath tub. Cynics say that the Korean is washed only twice in his life,—when he is new born and when he is a corpse, but this is probably a foreigner's exaggeration. Nevertheless it is to be wished that in a country so liberally provided with animal and vegetable fat as is Korea, the soap factory may soon be a permanent institution. Very probably when godliness becomes more common, its next door neighbor, cleanliness, will not be absent. It is certain that one of the new horizons needed by these people, so long hermits from the world, is the conception of the benefits and value both of physical and moral purity. The language itself, apart from what missionaries and long residents tell us, shows the awful prevalence of horrible diseases, which can be and ought to be checked and controlled, and explains why Korean families are so small and why the awful mortality among infants is so great. In a word, language, history, and the multiplying reports of eye-witnesses all agree that Korea and the Koreans present to-day a picture similar to that of Old and unreformed Japan prior to the coming of the forces of western civilization and Christianity. The tremendous manifestation of energy in that re-birth of modern

Japan, which dates from 1868, is, let us hope, the prototype of the Korea to come. Despite her long humiliation and hermit life, the fact must not be forgotten that this people gave Japan much of her civilization. Furthermore, Korea is the only nation in the Far East that has produced a true alphabet. More glorious than all, Korea is the home of true printing, the place of the invention of movable types. Long before Gutenberg or Coster the Koreans printed books with separate and distributed type made of copper. Probably the Mongols brought this Korean invention into Europe.

We might dwell further upon those reflections in the mirror of language and history which show how the mountains, the rivers, and the ocean have influenced the Korean imagination and moulded history and life. We could illustrate, with proverb and idiom, the part which the tiger and leopard on land, and the monsters of the water, have played in stimulating and developing the Korean man, his rhetoric and his art.

It would be easy to show especially how the language reveals the lack of personality in Korean. In common with his brethren of all that part of Asia dominated by Chinese culture, the Korean suffers from deficiency of self-revelation and consciousness. He has not reached the stage of intellectual development in which he is able to draw a clear line between mind and matter, Creator and creation, the living being and the inanimate object. He does not personify, he has very little metaphor. He knows little of that gorgeous imagery and the profuse and extravagant tropical language, which we associate with the word "Oriental," and accurate with the paradoxical *western* Orient. Like the Chinese, the Korean's language and literature are intensely matter-of-fact. The best of his literature, even his poetry, is descriptive; his written history consists almost entirely of annals; there is hardly any such thing as portrait painting and no sculpture which can compare with that of any European nation. This impersonality of conception which has so feeble a grasp of the distinction between mind and matter, or between the individual and the multitude, is manifested in every department and product of the national intellect. In grammar there are no pronouns, but an amazing number of honorific words, while so little formal logic is exhibited in the language that one could write a book as big as Macaulay's "History of England" or Gibbon's "Decline and Fall of the Roman Empire" *in one sentence*,—so many and so necessary are the Korean conjunctions. In a word, here is a country and people where mental initiative was long ago practically lost, where originality was swamped by too slavish dependence upon China, where the original poverty of mind and dearth of ideas has been almost petrified, so that to-day the Koreans are a people intellectually comatose and morally semi-paralyzed.

Yet in such opinions and judgments we must not go to an unreasonable extreme, and especially must the American take lesson and warning from the average British tourist, book-maker and politician. There is a wonderful family likeness about English books on Korea; for, to the man to whom "British Interests" is a religion, the only orthodoxy concerning Korea is that she is hopelessly corrupt and can only save herself by adhering to China, which is, after all, only a British opium-shop and a place for the sale of Manchester shirtings, and possibly a scrap of the earth which at some future time will, like India, become a part of the British Empire.

The American, however, sees differently. From the first, both the individual and the United States Government have believed that there is hope for Korea, and that she is and ought of right to be, independent. Neither American missionary, traveller, diplomatist nor statesman, believes that the case of the peninsular kingdom is hopeless; but, that even as Japan saved herself through American influence from becoming an India and seems able to work out her own salvation, so, measurably at least, despite her unfortunate geographical situation and interior limitations, Korea can live and thrive by working out her national genius and destiny. Her age alone demands respect. The benefits which she has conferred in past ages upon Japan deserve recognition beyond that of mere sentiment. Furthermore, the actual facts of recent years seem to point as surely to Korea's ability to win and hold an independent place in the world's history, as surely as the shadows of the sunset point toward the sun rising. Let us see.

Unquestionable as has been the awakening influence upon Korea of the march of events in great China, yet we have reason to believe that even more influential in stimulating to new life has been the advent of the Americans in what is England's "far east" and our "far west." When, in 1853, Perry's Armada of western civilization mirrored the stars and stripes on the waters of Yedo Bay, that peaceful evening gun fired from the *Mississippi's* deck at nine o'clock of July 7th, 1853, was the requiem of Old Japan. The hail and welcome from the sunrise gun of July 8th, was a salute to the rising sun of New Japan. The firing of that unshotted Columbiad, symbol of America's peaceful conquest of Japan, by means of the missionary, teacher, engineer and adviser, was also heard in the hermit peninsula. Five years later, a victory even grander than Perry's was achieved by Townsend Harris, when the once hermit country was opened to foreign trade and residence. Then began that ferment of ideas and quickening of movement which in fifteen years made feudalism a dream and opened the fresh morning of the long bright day of New Japan.

This splendor in the near east dazzled also the watchers on the high peaks of Korean observation. For, while in the Hermit Land of Chō-sen the mass of humanity was like the traveller amid snow and glaciers, who half blinded and frozen has yielded to the sleepy delight of insensibility and approaching death, yet there were, as in Old Japan, a few inquiring spirits earnestly awaiting and looking for signs of the dawn. These Koreans loved their country with a fierceness of patriotism that, besides having in it elements of selfish greed, would stop at nothing congenial to their code of morals, whether assassination, palace-seizure, or abundant bloodshed, to carry out their ideas. As no stream rises higher than its fountain, it would be idle to expect that the regeneration of a nation steeped in moral corruption could proceed in angelic or saintly ways, or without those bloody revolutions which are so common even in the history of Christendom. Nevertheless, with all their faults, which are many and great, we believe that those who in 1884 tried, by such means as they were familiar with in their own history, to awaken their country and people to new life, were noble patriots, ranking, in motive at least, as high as the highest in Korean history. Knowing that while anciently there were many civilizations, but in these days of the world-nerves of steam, electricity and international law, there is but one, they determined at all hazards to have in Korea that one civilization.

So, while Japan was entering upon that career which has surprised the world (and which Americans recognized and welcomed as genuine, even before the Murata rifle had pierced the shell of Chinese conceit), two or three Korean young men were opening their hearts to each other concerning their country. They took long walks in the country, beyond those city walls which have ears, and safe from the spy lodged in floor or ceiling or with eyes glued to the keyhole. They discussed what should be done to save their country. One of them, Kim Ok Kiun, "violated the frontier" and crossed the seas to Japan. There, he saw an old world becoming a new one. He himself tried the virtues of leather boots and cloth trousers. He parted with his topknot though only after tears and grief. He learned the comfort of felt hats, woollen underclothing and linen shirts, and thus found what good working clothes, with all their ugliness, those of the West are. He wore a watch and learned the preciousness of time. He saw the fairy-land of modern applied science and how the western men had tamed the dragon of steam and made wings of electricity, in a way that put to shame even the mythology of his native land. Coming back home he told others. Soon in Japan there were other hermits in the world's market-place. Little companies of Peninsulars got themselves inoculated with the anti-toxine of semi-European Japan, so as to be proof against further attacks of the Chinese virus or diseases; while all the time they were undergoing a kind of new birth that made them another sort of men. Their whole world of view was different. One of them was a noble of highest rank and of royal blood, and he, coming back to Seoul, was the first to boldly penetrate the king's presence and told him what he had seen in the new world beyond the sea.

What a story was that! to compare Old and New Japan, and study results was enough to make the head of a Korean king swim. Korea was a country eaten up with parasites. One-tenth of the population lived on the other nine-tenths. A great mass of lazy, non-tax paying, non-producing gentry called "Yang-ban" (civil and military), wanted to keep things as they were; that is, to let disease, ignorance, poverty and oppression run riot. They would prevent any motive in the laborer or farmer or trader to gain wealth or get comfort, let superstition run riot; keep out light and knowledge and press down and hold down the people under the awful incubus of Confucianism and the Chinese system, which meant permanent paralysis and ultimate national death through foreign conquest. Even more clearly than a Christian or a Hebrew, they understood the prophecy of the civilization of to-day, though they may never have read it,—"The nation that shall not serve shall perish."

What a grand story that princely traveller from Japan told; of a multitude of jealous sections and principalities, once held to the semblance of order by a military despotism, now transformed into a united country, full of willing hearts and working hands; of a national army, navy, postal, educational, and light-house system; of horrible and destructive diseases, mastered, and held under the firm hand of science; of monopoly and privilege broken down; of the old classes of gentry now reduced to the rank of producers, and, instead of receiving stipends from the government treasury, paying taxes and tolls; the army and military promotion open to every boy in the land; a system of public schools that, besides being open to every child in the country, added to their own native light the splendor of western knowledge; the land put practically into the hands of the actual cultivators; the courts open to all; the forces of the universe chained, harnessed and obeyed; the old barbarous customs of both peace and war, the exposure and murder of infants, the abominations and brutalities, inherent in the old codes imported from China, and all integral parts of feudalism banished forever; the national wealth trebling and quadrupling, and population increasing at a rate unknown in any previous history of Japan, new worlds of thought entered and a new spirit possessing the people; while up and down the country were men and women from the West who without money and without price were giving their lives to the teaching and the healing of the people and to the benefit of their souls and bodies—that was the story of New Japan.

This was what the Korean patriots coveted for their own land; but, how to bring about in Korea what was already visible in Japan; that was the question. The peninsular state and people had not enjoyed that interior preparation which Japan, in the profound peace of two hundred and fifty years, without foreign invasion had secured. Korea had not the benefit of the genius of an Iyéyasŭ, who began the new era of art, science, literary culture and investition, whose flower and fruit we now behold. Most of all, Korea had not had the benefit of a settlement of Dutchmen, who for two hundred years kept on silently but surely leavening with their words and thoughts, their books and their sciences, their medicine and their trade, the great mass of men in hermit isolation. How then, could these Korean patriots bring about reform?

Who can blame the revolutionists of 1884 for being Koreans, for following the precedents of centuries, for doing only what seemed possible to do? Better, we may say, the slow processes of the missionary and the teacher; but even these, as well as all foreign ideas, were under ban. The time-honored Korean way of effecting a change in government was to form a plot, have the conspirators meet near the palace, seize the person of the king, cut off the heads of opposing ministers and then issue the edicts of reform in the royal name. Is not this, or dynamite, the standard method in every country without representative institutions, and where the popular voice is repressed? Had not the Japanese done the same in 1868? Did not a few daring spirits seize the person of the emperor, and institute reform in his name? So they read Japanese precedent and history. Why should a Korean hesitate? Would not the means sanctify the end?

So, after drinking deeply at the Japanese spring, and seeing, also, the wonders of America and Europe; after the American treaty had been signed and American ships took eager pupils around the world, the cosmopolitan Koreans came home,—the wax to be melted and the clay to be hardened in the same fire. One or two of the pro-Chinese Koreans who had gone abroad came home more Asiatic and ultra-Confucian than ever, determined to keep Korea as it was. They branded western progress as barbarism, and looked upon Christianity as vastly inferior to Confucianism. On the other hand, the Progressives, fully converted to the ideas of Christendom,—whether we call those ideas collectively Christianity or civilization,—resolved to lose no opportunity. Pretty soon they saw, or imagined they saw, that the "irrepressible conflict," already begun when the American treaty was signed, required that the fire should break out which should bake the clay of conservatism into unchangeable terra-cotta and melt the wax for fusion into new forms,—perhaps for utter destruction, perhaps to be moulded into the model of a new Korea that should come to perfection under the statesman's art.

So, resolving to kill rather than to be killed, and following out in perfection of detail the true Korean and old Japanese programme, they set in motion that revolution of 1884 which seems to be the pivot of Korean modern history. The order of procedure was, first, incendiarism; then assassination, on the evening of the opening of the new post-office; then the meeting at the palace; the seizure of the king's person; the decapitation of the opposing royal ministers; the revolutionary edicts changing the customs of ages with a stroke of the pen; the fraudulent use of Japanese troops; collision and bloodshed between the foreign military, with victory resting with the overwhelming force of Chinese; a reign of Anarchy, while the American flag flew over the only refuge for the foreigner in Seoul; the flight of the little handful of deceived Japanese in the light of their burning legation; the absconding of the conspirators, and, for a time the settling back of things as they were, with a tremendous increase of Chinese prestige and power.

For nine years the Japanese Government gave to the Korean refugee Kim Ok Kiun the same asylum and protection which, under the laws of civilization, it gives to all foreigners. Finally in April, 1894, having used Japan as a ground of their barbarous plots, the Korean assassins in government pay succeeded in decoying Kim away to Shanghai, and murdered their victim. Then, China, approving such ancient barbarism, sent home the triumphant assassin, where he was rewarded with honors, money and fame, while the corpse of the Kim Ok Kiun was dismembered and publicly exposed. A Chinese war vessel acted under approval from Peking, for both purposes as common carrier and express agent.

Thus there were added fresh elements to precipitate the already impending collision, between western civilization as represented by Japan with all the glow and fierceness of a new convert, and Asiatic barbarism as represented by China with all the tenacity of an old believer who conscientiously shuts his eyes to new light. About the same time, in the southern Korean provinces, whether as a local uprising of the people against chronic and unspeakable oppressions, or as a party stimulated and fostered by the pro-Chinese faction at Court, the Tong Haks lifted up the banner of revolt. Then the ultra-Confucianists in Seoul asked of the Chinese government military aid. In eager violation of the treaty of 1885, China dispatched her soldiers first and notified Japan afterward.

This last ounce broke the Japanese camel's back. The murder of Kim Ok Kiun had fired the popular heart. The action of China exasperated the Government. Resolving not again to be caught napping or to be outnumbered, withal irritated at the overbearing behavior of the Chinese representative at Seoul for years past, knowing that China was massing her forces on the frontier and storing up Japanese coal for her steamers at Port Arthur, believing that Li Hung Chang wished to precipitate a war for his own purposes, realizing that the independence of Korea was a necessity for the peace of the East, Japan hesitated not for a moment to cast down the gage of battle. What were numbers and might and vast resources when Japan had her quarrel just and her war was for civilization? When in 1872 she changed her calendar,—the oriental symbol of sovereignty in the giver and dependence, if not vassalage, in the receiver,—from that of China to that of Christendom, she understood fully the reasons for the outburst of rage on the part of the Chinese and their insolent turbulence. Turning from the ideas, literature, law, civilization of China and Confucius to that of Christendom, she knew that some day China would present the bill and demand payment; but when the reckoning was demanded, Japan, though no more ready than David was, went out to meet the Goliath of Asia. With the light but efficient equipment of genius, young Nippon had moved out to meet the giant in the coal-scuttle helmet and heavy armor of prehistoric tradition.

We know the sequel. The Mikado's minister Hoshi Toru was dispatched to Seoul to demand a categorical answer as to whether Korea was independent, while General Oshima—once a peasant boy in Japan—with his mixed brigade accompanied the envoy. A skirmish in front of the palace demonstrated the superiority of Japanese valour and the Murata rifle. A military cordon was formed around the Korean Capitol. At Asan the Chinese power received its first blow. On the water, a transport, the *Kow-shing*, was loaded with Chinese soldiers. These poor men, victims of ignorance, were so far behind the times as not to know that Japan had adopted the rules of modern civilization. They flatly refused to surrender, not knowing that kind treatment and abundant rations would be theirs. Hence, according to the laws of all warfare, as thus far known, the men with arms in their hands who refused to surrender, were given quick death. On September 17, at the great battle of Ping Yang, the Chinese military power in Korea was utterly broken. At the beginning of October Korea was free of her old oppressors, for not an organized body of Chinamen remained on the soil. At sea, Japanese seamanship, skill valour and science, and all the qualities reflected in the mirror of Dai Nippon, won the day over the heavier guns, the thicker armour and the larger floating fortresses of China. The rest of the story of the war, in which Japan has conquered a territory twice as large as her own, broken down the fortress-barriers of the sea-way to Peking, and in which she has showed how useless it is now, as always, to expect that the battle is always to the strong, or that Heaven is always on the side of the heaviest battalions, you know well.

Meanwhile, these are great days for Korea; they are days of reconstruction and reform. The old Chinese system of government and social procedure has received its death blow. Already, under that statesman of marvellous constructive abilities, educated in Europe, and a true child of New Japan, Count Inoŭyé, true progress is being made. Beginning at the Capital, the king's palace is being cleared of eunuchs and an overgrown harem. The mighty mob of office holders and office seekers, ten times too large, is being lessened; appointment to office is to be according to ability and not on account of lineage. Provision has been made for a national army, navy, postal, railway, telegraph and lighthouse system. The ridiculous costumes and the methods of dressing the hair are to be changed. The rigid sumptuary laws, heretofore obligatory, are to be repealed, and human beings are to have liberty in things little as well as in things great.

To sum up the reforms, without going into too much detail, we may say that the New Korea will rise according to the model of New Japan. The vast parasitic element will be removed. Those who preyed upon the body politic will become producers. They will have the magnificent privilege of earning their own living. Let us hope they will purchase for themselves a good degree. Every encouragement is to be given to the attainment of wealth, and every motive strengthened whereby industry may become habitual and general. Already we see in office the men whose abilities and acquaintance with the ideas dominant in the modern world fit them to be "builders of a better time." The exiles who have so long hidden in our country are now back in office and honour, and the future of Korea is bright.

Already, our own country, true to her polity of friendship that has in it no taint of the lust of conquest, has, both publicly and privately, played the part of kindness to Korea. Besides having the first foreign legation in Seoul, and accrediting as permanently resident the first Minister, it has had such representatives as Ensign Foulke, U. S. N., and Dr. H. N. Allen. A score or more of honoured missionaries, noble representatives of American culture and character, are already in Seoul and at the ports. Some of the most substantial buildings in the country are schools, hospitals and dispensaries—the gifts of American Christians—for the benefit of the Korean people. American missionaries, physicians and teachers were the first on the ground to heal and to enlighten. Already the best books on the language, the first churches organized, the first relief to the wounded in battle, and the first graves of the men who have sacrificed their lives in behalf of Korea, are of Americans, who outnumber all other religious and civilizing envoys from Christendom. Let us hope that as the Americans conquered Japan with peaceful armadas, unselfish diplomacy, and a whole army of missionaries and teachers, so also Korea will be likewise conquered by the people of that country, which President Arthur called the "Great Pacific Power." Further, may we not hope that in the settlement of the present war, the influence of the United States may, in the readjustment of the map of eastern Asia, be powerfully exerted to modify, if not to prevent, that scheme of systematic robbery of Asiatic people which has been so steadily proceeding during the centuries?

THE MAPPING OF NEW YORK STATE.

BY

HENRY GANNETT.

In the mapping of its area, the United States is far behind the countries of Europe. This condition of things is strange in view of the fact that the settlers of this country came from the most highly civilized countries of Europe, where the need of maps has long been recognized, and where maps have been used for generations in planning improvements which involve a knowledge of the surface of the ground. Moreover, these settlers came to a country where everything had to be done to render it habitable, where towns and cities were to be built, where waggon roads, railroads, canals, means of water supply and all other modern conveniences which make a country fit to live in were to be constructed. A partial explanation of this neglect may be found in the division of responsibility between the State and the general government, whereby each has waited for the other to undertake the work. It may moreover be found in the fact that the only plans proposed, until recently, for making such a map involved so enormous an expense and so long a time as to deter our law-makers from undertaking such a tremendous work. Be that as it may, the fact remains that until some fifteen years ago there were no maps of any considerable part of the country which were at all accurate or serviceable, if we except certain parts of the far West which had been mapped rather crudely by the general government.

It is true that maps upon small scales had been compiled from various sources; in certain States such maps had been compiled from the subdivisional surveys of the General Land Office,[*] and in other States from private surveys of one sort and another; but these maps are upon too small a scale to aid in engineering works, and indeed many of them are mere diagrams of roads without any attempt at representing relief, or even drainage.

Meantime, however, much triangulation had been done in various parts of the country by the States and the general government, but, except along the coast and in New Jersey, this had not been followed by the making of maps. The skeleton had been constructed, but it had not been filled out with flesh and blood.

Such was the situation when, in 1882, the U. S. Geological Survey commenced its map of the country.

While this was the case with the country at large, New York, the most populous and wealthiest of all the States and in some parts the most densely settled, has been quite as backward as any other portion of the country. Prior to 1888 there were no maps of any part of the State which were worthy the name. The only map of the State in existence, known as the French map, was made by private parties, was compiled mainly from subdivisional surveys made a century ago, and from traverses of the roads and railroads. It is little more than a diagram of roads. This was published on a scale of 1:300,000, that is, about 4¾ miles to an inch, and practically represents all that was known of the State.

It was not from want of effort on the part of citizens or State officers that so little had been done. As long ago as 1827, Governor De Witt Clinton recommended the preparation of a map in a message to the Legislature, but the recommendation met with no response. Similar recommendations were made by Governors Hunt, in 1852, and Seymour, in 1853.

In 1875 the American Geographical Society became interested in the matter, and appointed a committee to study and report the condition of the maps of the State. Their report showed a very bad condition of things. It showed that the existing maps, made from these old land-parcelling surveys and by private parties, were as nearly worthless as possible, and recommended that the State commence a survey of its area. Largely as a result of this movement, the Legislature in 1876 passed a bill providing for a State survey, placing the work under a commission. Mr. James T. Gardner was appointed superintendent, and work was commenced in the following year. From that time until 1884, work was carried on continuously until it was stopped by the veto of Governor Cleveland in the year last named. During these eight years, primary triangulation only was done—no maps were made—and it was mainly on this ground that the work was stopped. The geodetic work of the U. S. Coast and Geodetic Survey in the valley of the Hudson River, and of the U. S. Lake Survey on the borders of the Great Lakes, furnished the base lines from which the State Survey extended triangulation into the interior. From the line Rafinesque-Helderberg of the U. S. Coast and Geodetic Survey, near Albany, triangulation was extended westward up the valley of the Mohawk as far as the western portion of Montgomery County. From the line Clyde-Victory of the U. S. Lake Survey, work was extended easterly and thence southward to the Pennsylvania boundary. The work was carried on efficiently and economically, and was of a very high character, comparing favorably in quality with that of the U. S. Coast and Geodetic Survey and the U. S. Lake Survey. Altogether, 312 primary points and 400 subsidiary points were located, covering and controlling about one-fifth of the area of the State. The entire amount expended by the Survey during its existence was about $118,000.

The work was executed with eight- and twelve-inch theodolites reading by microscopes, and was adjusted by the method of least squares. The quality of the work may be characterized by the statement that the mean error of closure of 200 triangles was but 2.″02.

The U. S. Coast and Geodetic Survey, in the course of mapping the coast of the sea and navigable waters of the country, has extended a system of triangulation up the Hudson valley, across to Lake Champlain and along the shores of that lake. It has also extended a belt of triangulation from the neighborhood of Albany westward, connecting with the work of the U. S. Lake Survey near Buffalo. The high character of this work is too well known to need any commendation. The amount of map work executed by this organization is, however, limited. It has mapped Staten Island and the immediate shores of Long Island, the banks of the Hudson up to Albany, and the shore of Lake Champlain, the average width of the belt along the shore being but a fraction of a mile.

The U. S. Lake Survey has carried on triangulation in the neighborhood of Lakes Erie and Ontario and the St. Lawrence River, and has mapped their immediate shores, the strip of mapping being even narrower, on an average, than that of the U. S. Coast Survey. The character of the geodetic work of this organization is high.

For a number of years, from 1872 to 1884, there was carried on in the Adirondacks, partly at private and partly at State expense, a survey of that region, under Mr. Verplanck Colvin. Of this, very few results have been published. The positions of a few points, numerous elevations, and a few local sketch maps are, so far as the writer is aware, the only contributions which this Survey has made to a knowledge of the geography of the State. It is understood, however, that there is much matter collected by this organization awaiting publication.

With the exception of a few points determined by the U. S. Geological Survey, immediately for the control of its maps, the above is a complete sketch of the triangulation executed in the State. This is represented upon a diagram of the State, Plate I, which shows that a large part of its area has been covered by primary triangulation.

This was the situation in the State when, in 1888, the U. S. Geological Survey commenced work there, in pursuance of its general plan of mapping the entire country. This plan contemplates the preparation of a map on scales of 1:62500 and 1:125000, or about one and two miles to an inch, the relief of the country being expressed by contour lines at intervals ranging from 5 to 100 feet. Under this plan somewhat more than one-fifth of the area of the country has been mapped.

The first work done in New York was in the vicinity of its metropolis, New York City, Brooklyn and their suburbs, and the result was the publication, shortly after, of four sheets, comprising the Greater New York. These four sheets, subsequently re-published in combined form, have been distributed by thousands. In subsequent years, the work was extended up the Hudson valley and into the Catskills.

Between 1888 and 1891 there had been mapped in New York by the U. S. Geological Survey 4,159 square miles. In 1892, the State Engineer, Mr. Martin Schenck, recommended to the Legislature that a small appropriation, $3,000, be made, for co-operation with the U. S. Geological Survey, in order to induce a more rapid prosecution of the work. This was agreed to, and the interests of the State in the joint work were confided to this officer. The result was that in that year the work was pushed much more rapidly, and aroused so much interest that in the succeeding year the appropriation was increased to $24,000, with $6,000 additional for determining county and township boundaries. Under this appropriation a formal agreement was entered into between the State Engineer, on the part of the State, and the Director of the U. S. Geological Survey, for the prosecution of the work, which agreement is here reproduced in full. It is a type of the agreements under which co-operation has been carried on by the U. S. Geological Survey to a successful conclusion with Massachusetts, Rhode Island and Connecticut:

AGREEMENT BETWEEN THE STATE ENGINEER OF NEW YORK AND THE DIRECTOR OF THE UNITED STATES GEOLOGICAL SURVEY FOR THE CONSTRUCTION OF A TOPOGRAPHIC MAP OF THE STATE OF NEW YORK.

(1) The preparation of this map shall be placed under the supervision of the Director of the United States Geological Survey, who shall determine the methods of survey and map construction.

(2) The order in which, in point of priority, different parts of the State shall be surveyed, shall be agreed upon in detail by the State Engineer and the Director of the United States Geological Survey.

(3) The work shall be based upon the triangulation of the U. S. Coast and Geodetic Survey, the U. S. Lake Survey and the New York State Survey, and wherever the triangulation is deficient it shall be supplemented by the U. S. Geological Survey.

(4) The survey shall be executed in a manner sufficiently elaborate to prepare a map upon a scale of 1:62500, exhibiting the hydrography, hypsography and public culture, and including all town and county boundary lines as established and marked by the State Engineer at the time of its completion, in form similar to the sheets already completed in this State. The preliminary field maps shall be on such a scale as the Director of the U. S. Geological Survey may select to secure accuracy in the construction of the final map.

(5) The hypsography shall be shown by contour lines with vertical intervals of 20 feet.

(6) The heights of important points shall be determined and furnished to the State Engineer.

(7) The outlines of wooded areas shall be represented upon proofs of the engraved map to be furnished the State Engineer.

(8) For convenience the Geological Survey shall, during the progress of the field work, pay the salaries of the persons employed therein, while the travelling, subsistence, and field expenses shall be paid for the same time by the State. For the office work on the map the salaries shall be divided between the two agreeing parties in such a way as to equalize expenses, provided that the total cost to the State of New York of the field and office work for the current year shall not be more than twenty-four thousand ($24,000) dollars.

(9) During the progress of the work free access to the field sheets and records of the topographers and draughtsmen shall be afforded the State Engineer for examination and criticism; and should the

State Engineer of New York deem that the work is not being executed in a satisfactory manner, then the said State Engineer may, on formal notice, terminate the agreement.

(10) The resulting map shall fully recognize the co-operation of the State of New York.

(11) When the work is completed the State Engineer shall be furnished by the U. S. Geological Survey with photographic copies of manuscript sheets; and when the engraving is completed and at all times thereafter when desired, the said State Engineer shall be furnished by the said Survey with the copper plates of the sheets of the map for use in printing editions of said maps."

Under this agreement, work was prosecuted very actively during 1893, and during 1894 until the State appropriation was exhausted, after which the U. S. Geological Survey continued work at its own expense, but on a more limited scale. In the latter year an attempt was made by the present State Engineer, Mr. C. W. Adams, to obtain an appropriation for continuing the work. This, however, was defeated, and in the place of it, a bill for reviving the old Adirondack Survey was passed, containing a provision for co-operation with the U. S. Geological Survey, but on a limited scale. This was so encumbered by objectionable features that it was vetoed by Governor Flower. The following clause from the Governor's veto message explains the reasons for his veto:

"The so-called Adirondack Survey began practically under Mr. Verplanck Colvin in 1872. It practically ended, though far from complete, in 1883, when Gov. Cleveland condemned it in strong words, and since that year no appropriation for the purpose has been granted, owing to the strenuous opposition to the character of the work and the manner of its carrying on. From 1872 till 1884 the cost of the Adirondack Survey alone amounted to upwards of $135,000, while only a very small percentage of the total work required to be done has been accomplished. While these surveys are very desirable, they should be placed in the most competent hands under the direction of the State Engineer, and they should be carried on as economically as possible. To revive the work which was quite properly discontinued by law in 1883, and for this purpose to create an independent new bureau outside the State Engineer's office, with a salaried superintendent at $5,000 a year and assistants, is unwise and extravagant legislation. If the State's experience with such a bureau in the past is any indication of what its experience would be in the future, the people should be spared so great an imposition.

By the passage of this bill the Legislature has also retarded the very excellent work on the State topographical survey which has been going on so successfully under the joint supervision of the State Engineer and the U. S. Geological Survey. Under the arrangement entered into between the United States and New York State authorities, the State was to pay half the expense of this work and the Federal government half, and up to date about a fifth of the area of the State has been surveyed. This bill leaves the question of Federal co-operation substantially to the proposed superintendent of the State land survey, and while making the consent of the State Engineer contingent excludes him practically from participation in the work. A strict construction of the bill would also seem to make it optional with the superintendent whether he should set apart for the general survey $10,000 of the $30,000 appropriated, as is authorized in the bill."

The work done in the State up to the present date is represented upon the accompanying map, Plate II, and is summarized in the following statistics:

The total area surveyed is 10,000 square miles, or a trifle more than one-fifth its area. This work will be represented upon 57 atlas sheets, each covering 15′ of latitude and longitude, half of which have been already engraved and issued, and the remainder will be published within the next few months. These sheets are upon a scale of 1:62500, with a contour interval of 20 feet. The cost of the work, exclusive of engraving and printing the sheets, has been, on an average, and in round numbers, $10 per square mile.

The method of surveying employed in this work, although generally similar to that employed by other organizations, differs in certain details. It consists essentially in the location by one or another method of numerous points scattered over the area to be mapped, and then sketching the map with reference to these points. The work of making these locations constitutes the greater part of the operation, but these being mathematical points, do not appear as any part of the map itself, all of which is the result of the operation of sketching. The points selected for location are the summits of hills, the junctions of streams, houses, churches, road corners, etc. They are selected for location in such way as to control to the best possible advantage the contour lines, the streams, roads and other objects which are to be sketched.

Each sheet of the map is surveyed separately. Upon each sheet are located by primary triangulation two or more points as initial points. In some cases these are furnished by pre-existing triangulation; in other cases the U. S. Geological Survey has been obliged to make its own locations, and for doing this primary work, eight-inch theodolites, reading by microscope to 2 seconds, are used. These primary positions furnish a basis for plane-table work, and the work from that point on is relegated to that instrument.

The plane-table is a universal instrument for making maps, applicable to all scales, all methods and all kinds of country. Of all instruments it is the most simple and direct, and, other things equal, produces the most satisfactory results, since with it the map is made directly upon the ground with the country before the topographer as copy.

It consists essentially of a board of convenient size, mounted on a tripod in such wise that it may be levelled, turned horizontally and clamped in any position. To this board is attached a sheet of paper upon which the map is made. A projection is drawn upon this sheet and the primary points are located thereupon. Another essential feature of the instrument is the alidade, which consists of a metal ruler to which is attached a telescope, or, in the cruder forms, a pair of sights.

To commence the work with the plane-table, the instrument is set up over one of the primary positions in the area to be mapped and levelled. The ruler of the alidade is laid along the line connecting this station with another primary point. Without moving the alidade, the whole table is then turned horizontally until the telescope points upon the other station. The table is then in its proper position, or, technically speaking, it is "oriented," and is then clamped in this position. Then keeping the ruler upon the point on the paper representing the station occupied, sights are taken and lines drawn to all points in view, which it is desired to locate. The table is then moved to another primary station, is oriented by pointing upon the first station, and lines are drawn to the points sighted from the first. The points of intersection of these lines are the locations of the points sighted. Any of these points may be occupied as stations in a similar manner, and lines drawn to other points, thus locating them. Thus the sheet is covered with locations, and the positions of all points desired are fixed.

There is another method of making locations which is used extensively in mapping roads, streams and other linear features. In this, instead of locating points by the intersection of two lines or triangulation, location is made by measuring the direction and distance. The directions are measured with a plane-table, using commonly a cruder instrument than that employed in triangulation, and the distances are commonly measured by counting the revolutions of a wheel, although sometimes the telemeter is used.

Heights for the location of contour lines are measured by a variety of means dependent upon the accuracy with which they are desired. Primary heights are measured by the use of the Wye level, by which profiles are run across the sheet. From points in these profiles, vertical angles are taken to many points, and their heights determined thereby, while the heights of minor details are measured by the use of the aneroid, checking it frequently upon known elevations.

When the locations and height measurements upon a sheet have been completed, all these data are assembled upon one sheet, and then taken in hand by the most experienced sketcher in the party, usually its chief, who goes over the sheet, occupying all points which seem desirable, and sketches the natural and artificial features, referring them for position, size and shape to these located points and height measurements. Since the positions are scattered over the sheet, usually with a dozen or more on each square inch, there is little room for error in the sketching.

As is shown by a glance at the map representing the progress of topographic work, the regions already surveyed comprise most of the Hudson valley, and part of that of the Mohawk, portions of the lake region, the surroundings of Niagara Falls, Buffalo and Rochester, the neighborhood of Watertown, the shores of Lake Champlain and part of the high mountain regions of the Adirondacks and the Catskills.

HENRY GANNETT.

REPORTS OF A CONFERENCE ON GEOGRAPHY.*

BY

ISRAEL C. RUSSELL.

A "Committee of Ten" was appointed by the National Educational Association in 1892, to consider the general subject of uniformity in school programmes and in requirements for admission to college. This committee, of which President Eliot of Harvard University was chairman, after preliminary discussion, decided to organize nine conferences consisting of ten representatives each, to be selected from instructors in schools and colleges. To each of the conferences a special branch of study, as for example, Latin, mathematics, natural history, geography, etc., was assigned. To each conference a list of eleven questions relating to school studies and to requirements for admittance to college was submitted, on which discussion and recommendation were invited. The report of the Committee of Ten was based on the reports of these several conferences.

The Conference of Geography held sessions in Chicago on December 28, 29 and 30, 1892, the following representatives being present:

T. C. Chamberlin, University of Chicago; George L. Collie, Beloit College; W. M. Davis, Harvard University; Delwyn A. Hamlin, Rice Training School, Boston; Mark B. Harrington, Weather Bureau, Washington; Edwin J. Houston, Philadelphia; Charles F. King, Dearborn School, Boston; Francis W. Parker, Cook County Normal School, Chicago; Israel C. Russell, University of Michigan.

Meetings were held at the Cook County Normal School and at the residence of Colonel Parker, the Principal of that well-known institution. I cannot let this opportunity pass without grateful acknowledgment of the generous hospitality extended to the members of the Conference by Colonel and Mrs. Parker.

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* Report of the Committee on Secondary School Studies appointed at the meeting of the National Educational Association, July 9, 1892, with the reports of the Conferences arranged by this Committee, and held December 28–30, 1892 (published by the U. S. Bureau of Education, Washington, D. C., 1893), pp. 1–249.

Republished for the National Educational Association with the title "Report of the Committee of Ten on Secondary School Studies; with the reports of the Conferences arranged by the Committee," by the American Book Company, New York 1894, pp. I–VI, 1–249.

In the Conference a wide range of topics relating to the subject matter and methods of teaching geography were discussed, and the outline of a report to the Committee of Ten agreed on. A committee of two, of which Professor Chamberlin was chairman, was appointed to write a detailed report. This report, after being revised in accordance with suggestions from other members of the Conference, was duly submitted to the Committee of Ten.

The discussions of the Conference developed the fact that there was such a diversity of opinion among its members in respect to certain of the questions reviewed, that unanimous agreement could not be had. A Minority Report was subsequently sent to the Committee of Ten, by Mr. Houston, which, together with the Majority Report, has been printed in the volume described in an accompanying foot-note.

It is my desire to set forth the facts of greatest general interest embodied in these two reports, as fully as the space at command will permit. Although my name is appended to the Majority Report, my share in its production was trifling. I treat the report here as, what in fact it is, the work of others.

RELATIONS OF GEOGRAPHY.

At the very beginning, the Conference was confronted with the question "What is Geography?" It was found to be difficult to strictly define the scope of the science, because of its intimate relation and gradation into related sciences. It did not seem advisable to attempt to greatly modify the range of the subjects usually embraced under the term geography, but the following phases of the subject, in the order in which it was thought they should be studied, are emphasized in the Majority Report:

1. *Elementary Geography*, a broad treatment of the earth and its inhabitants and institutions, to be pursued in the primary, intermediate, and lower grammar grades.

2. *Physical Geography*, a more special but still broad treatment of the physical features of the earth, atmosphere and ocean, and of the forms of life and their physical relations, to be pursued in later grammar grades.

3. *Physiography*, a more advanced treatment of our physical environment in which the agencies and processes involved, the origin, development, and decadence of the forms presented, and the signifi-

cance of the features of the earth's face, are the leading themes, to be pursued in the later high-school or early college years.

4. *Meteorology*, a specialized study of atmospheric phenomena, to be offered by schools that are prepared to do so properly, as an elective in the later high-school years.

5. *Geology*, a study of the earth's structure and its past history, to be offered by schools prepared to do so properly, as an elective in the last year of the high-school course.

Each of these divisions of the subject is considered at length and many facts of general interest brought out. Let us glance at these discussions under their respective headings:

1. *Elementary Geography* should, in the opinion of the Conference, deal not only with the surface features of the earth, but embrace also elementary considerations of related sciences. This is recommended in order that scholars may obtain a wide general knowledge of nature, which will serve a useful purpose in case their studies end before the high school is reached; or serve as a foundation for more specialized study in case opportunities for advanced work can be embraced.

Applied geography, or geography in connection with commerce, history, botany, zoölogy, etc., it is urged, should be studied in connection with the subject to which they are secondary and give aid. It is recommended, for example, that political geography should be studied in connection with history, and that the distribution of plants and animals should form an important feature in the teaching of botany and zoölogy. This recommendation is based on the belief that in general all forms of applied geography are most advantageously studied in connection with their application, providing that a general knowledge of elementary geography has been previously given.

Physical Geography and Physiography. — In more advanced geographic studies, in the opinion of the majority of the Conference, the features of the earth's surface should receive special attention in connection with the agencies that produce and destroy them. The fact is emphasized that in this branch of the subject and in methods of treating it, there has been such a marked advance within recent years, largely, I may remark, through the studies of American geologists, that practically a new science has been developed for which a special name is desirable. *Physiography* is recommended for this purpose. To this decision the Minority Report takes decided exception, and gives preference to the retention of the term physical geography. This adverse opinion is based largely on the indefiniteness of the term suggested as now used by various authors. It may be said in this connection, however, that the objection cited applies equally well to many terms necessarily introduced in a growing science, and does not recognize the fact that the English language is itself developing and being modified in order to keep pace with intellectual progress.

The differences between the Majority and Minority reports are not radical, and are illustrated fairly well, I think, by the example cited. In the former, the recent advances and broader aspects of geographical science are recognized; in the latter, greater deference is paid to tradition.

The ground to be covered by physiography, or physical geography in its enlarged and modernized phase, embraces the study of the wasting of land surfaces, the transportation of the waste to the sea, and its deposition on the marginal sea bottoms; a brief account of the more common minerals and rocks in their relation to the changes of river action during the progress of land denudation; the relations of lakes, waterfalls, divides and their migration, flood-plains, deltas, etc., to the stage of river development in which they are observed; the development of shore lines and the variation of their features under the long-continued action of the shore waves; the interruptions of the normal progress of denudation and shore action by depression, elevation, or deformation; and by volcanic action or by climatic change, including briefly the effects of glacial action.

It is recommended that the various kinds of land forms, as plains, plateaus, mountains and volcanoes, should be considered in accordance with the constructional processes involved in their origin, and that their distribution over the earth should be briefly sketched.

A condensed account is also suggested of the results of recent deep-sea explorations so far as they relate to the forms of oceanic depressions and of the submerged continental borders, the condition of the ocean bottom, character and causes of currents and tides, etc. Should time permit, this phase of the study could be profitably extended so as to include the bearing of these conditions on the distribution of marine life.

The paths marked out for geographical study in the high schools necessitate an acquaintance on the part of the teacher with the latest advance in a rapidly-growing science. Many of the most instructive chapters on topographical development have not as yet found their way into text-books on geography. Properly speaking, there is no text-book available which adequately reflects the modernized phase of the subject. Hence, the hope that physiography will be widely introduced in high-school courses, cannot be realized until the few colleges adequately equipped for preparing teachers in this department have sent forth their students in considerable numbers.

Admirable courses in meteorology, suggested principally by Professor Davis, are outlined, both for grammar and high schools. These include laboratory work, the use of instruments, observations of the weather, preparation of careful records, the study of weather maps, etc. The plans proposed are so comprehensive that they might be advantageously adopted by many institutions of higher grade than the high schools.

The teaching of geology, although included among the subjects which the Conference was invited to discuss, is but meagrely treated. It is recommended, unless unusual facilities are available, that the study of the geography of the earth in past ages, as well as its life history, etc., be left to normal schools and colleges.

ORDER OF TREATMENT BASED ON MENTAL PROCESSES.

This broad subject is treated in the Majority report under four headings, viz.: (1) Observational geography; (2) Representative geography; (3) Descriptive geography; and (4) Rational geography. Of these four discussions the first is probably of greatest importance and contains the most ideas that stimulate thought.

In the judgment of the Conference, observation should go before all other forms of geographical study and prepare the way for them; its object being to develop the power and habit of geographic observation, to give the pupils true and vivid basal ideas, and to arouse a spirit of inquiry and a thirst for geographical knowledge. This work of observation should begin with those features that lie immediately about the pupils and so fall easily within the reach of their direct study and ready comprehension. In rural districts the natural features of the surface will obviously form a large part of the study, while in cities the artificial features must largely take the place of these. In the one instance, natural geography, as seen in the forms of the land, including hills, valleys, plains, meadows, divides, streams and lakes, will predominate; while in the other artificial or humanistic geography will receive leading attention, as streets, railways, wharves, harbors, parks, plots, wards, etc. But something of both these groups of subjects may be found and utilized in both localities. Neither should be neglected, for the pupils need not only to acquire clear ideas of the things by which they are chiefly surrounded, but type ideas of the things which characterize other localities, and of which they need to form correct ideas without being able to see them. Observation, however, should not be confined simply to the passive fixed features by which pupils are surrounded. They should observe the agencies that produce surface changes, such as winds, rains, floods, thawing, freezing, cultivation, etc. The temporary streams that follow heavy rains represent on a small scale many of the natural processes by which surface features are produced. From these immediate agencies the observations should extend to the phenomena of the weather and the climate, such as temperature, winds, clouds, seasons, etc.

An important supplement to one's ability to see the features that give expression to the face of nature, is facility in representing them in sketches, maps, models, etc. The study and practice of descriptive geography is thus only secondary in importance to the training of observation, and carries with it the ability to read maps, and obtain from them a realistic mental picture of the objects they portray.

In discussing rational geography, the fact that all the surface features of the earth are changing, that they have a past history and are on the road to future developments, is made prominent. It is by this branch of geographical study that the reasoning powers are most fully exercised. Each element in a landscape is due to antecedent causes, and preserves in its own form much of the history of its development. It is urged that the study of the reason of things should be assiduously cultivated, for it is the soul of the science.

GEOGRAPHY IN RELATION TO MENTAL DISCIPLINE.

The Majority report emphasizes the fact that clear and definite views of the culture purposes of geographical study cannot be too strongly urged upon the teacher. It is recommended that special attention be paid to the development of three separate classes of mental activities, viz., the power to observe, the power of scientific imagination, and the power of reasoning.

As resources for the training of the observational powers, attention is directed (1) to the study of surface forms, such as hills, valleys, plains, plateaus, streams, lakes, shores, and all similar phenomena within the pupils' horizon; (2) observations on the temperature and its relations to the direction of the sun's rays, the apparent motion of the heavenly bodies, as their circling round the poles, the rising and setting of some stars and not of others, the shifting north and south of the sun, moon, etc.; (3) movements of the atmosphere and their effects, rain and its effects, snow and its effects, fogs, clouds, etc.; (4) plant life and its dependence on heat, moisture, sunlight, etc.; the influence of soil, slope, etc.; (5) observations on animal life, of similar nature; (6) observations on man in the family, in educational, church, social, and business organizations, in city and town organizations, and so on up towards the larger human organizations and the forms of government.

Under work involving the culture of the imagination will fall the formation of concepts of all the larger features of geography and of all features beyond the range of observation, as (1) the river basins, the great relief systems, the continental divisions and subdivisions, the ocean bottoms, the distribution of land and water, and, in a less pronounced way, the picturing of all geographical features not actually observed; (2) modifications of apparent motions due to imagined changes of position of the observer on the earth's surface, such as the position at the pole, on the equator, on the different parallels, etc.; (3) distribution of the meteorological agencies over the globe, as moisture, winds, climate; the mental picturing of the great wind movements, the cyclonic circulation, the zones, etc.; (4) distribution of plant life developed in the form of a mental picture in its relations to the earth's surface, to land and water, to altitude and climatic conditions, as distinguished from a mere memorizing of the facts of distribution without any such pictorial conception; (5) distribution of animal life in like manner; (6) distribution of races of men, forms of government, national territory, etc.

The foregoing lists of topics furnish the ground-work for the culture of the reasoning powers if the question of causes and agencies is raised in connection with them. Why do the several features take the forms they do? By what agencies were they caused, and why did these agencies work in such ways? How did these forms originate? What are the causes of the winds, the clouds, the changes of temperature? Why are the animals and plants distributed as they are? Why were these cities located as they are? Why are these large and those small? Why do these railways take this course rather than another? And so on.

In discussing methods of presenting geographical information, stress is given to the equipment of geographical laboratories. In reading these recommendations, one is saddened by the thought that with few exceptions, and at present I have but two in mind, the colleges and universities of America lack the equipment that is thought requisite for public schools. It may be said, perhaps, that the requirements of schools and colleges differ, but all, I think, will admit that geography in some of its phases is as well suited to be taught in the colleges as in the schools.

It is recommended that schools be supplied (1) with large-scale maps of their own district and their own State; (2) with the best obtainable series of general maps, prepared as far as possible on uniform scales; the style of projection and the scale being indicated on each map; (3) with a sufficient number of small globes to enable every scholar sufficiently advanced to study the globe individually; (4) with illustrations of various kinds as liberally as possible, including photographs, lantern slides and means of projection; (5) if possible, with a few models (whose scale should not be unreasonably exaggerated) representing the home district, if these can be obtained, or, if not, at least with typical models of some interesting regions of our own country; (6) with books of reference on history, travels, natural history, etc.; involving geographical elements and suitable for the use of both scholars and teachers, and in increasing numbers year by year; and (7) with a selected series of topographical maps.*

One of the questions submitted to the Conference for discussion and recommendation relates to the time at which the study of geography should be begun. In reply, it is stated that while the simple facts of a geographical nature cannot be introduced too early in a child's education, it is not recommended that the formal study of geography as a separate subject, however elementary, be undertaken in the lowest grades. But the habit of observation should be stimulated as soon as the child enters the school and its development constantly encouraged.

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* The importance of placing good topographical maps in the hands of students led to the appointing by the Conference of a committee consisting of Messrs. Davis, King and Collie, to consider in what way the maps issued by various Government and State surveys might be made available for school use. A valuable report by this committee entitled, "The Use of Government Maps in Schools" has been published by Henry Holt & Co., New York. Price 34 cents. In it are instructive descriptions of over fifty phases of relief that are well illustrated by maps which can be had by teachers either free of charge or for a nominal sum to cover press-work and paper. This report of 65 pages contains a brief account of the maps issued by the U. S. Geological Survey; U. S. Coast and Geodetic Survey; Mississippi River Commission; Missouri River Commission; U. S. Lake Survey; State topographic surveys, including those of Massachusetts, Rhode Island, Connecticut and New Jersey; U. S. Weather Bureau, and U. S. Hydrographic Office.

Outlines of methods of instruction in various grades are suggested, but it is in connection with high-school work that the broadest treatment of the subject is presented. These recommendations are filled with the spirit of modern science and pregnant with ideas that are of interest not only to teachers, but to all who are inclined to either fireside-travel or active exploration.

In illustration of the scope of physiography, the development of land forms is presented as an indication of the nature of the paths to be followed. It is stated that the general conception of the wasting of a land area and the ultimate production of a lowland of denudation from whatever form the area had in its earlier stages, deserves early and deliberate illustration. Around this fundamental conception, the teacher may group a variety of facts, both local and general, concerning the rocks and their structural relations in the earth's crust, on the one hand, and the weather and its expression in climate on the other hand. However hard its rocks, however dry the climate, a lowland of faint relief is the ultimate form of every land area under the slow wasting of its surface; and during all the progress of this wasting, a systematic sequence of forms is exhibited. The essential elements in the study are thus introduced early and in their simplest form; the slow but continuous variation of land forms under these processes; the long duration of time that must be considered, even if not conceived. Every part of the land surface represents some stage in the course of its progress from its beginning in constructional uplifting or accumulation, towards its end as a completed lowland of denudation.

The particular consideration of rivers, under whose guidance the waste of the land is carried to the sea, may be advisably introduced as the next general heading; because, from whatever constructional processes of accumulation or uplift a region has its beginning, there are certain general features of river-life common to all regions, and these may be conveniently presented before the different structional kinds of land forms are taken up. This serves not only to impress upon the scholars the systematic sequence of form-changes during the progress of general denudation, but also to emphasize the many features of the land that are associated with the development of its drainage. Throughout this division of the subject, particular care should be taken to bring the class into sympathy with the subject, by forgetting for the moment human measures of time and looking at rivers in the way rivers would look at themselves. Thus are examined the conditions that determine the original drainage area of a river, the location of its enclosing divides, and the arrangement of tributary branches; then the quick deepening of its valleys and the drainage of any lakes in which its waters may be at first detained, and, at the same time, the development of additional young side-streams, the accompanying subdivision of the drainage area, and, occasionally, the rearrangement of discharge by the shifting of divides under the action of active competing streams; with the rapid deepening of the valleys comes at first the development and later the extinction of the water falls; with the widening of the valleys comes the slow spreading out of land-waste in flood plains where the mature streams meander and in deltas, where the streams branch out in "distributaries." Late in river-life, when the inter-stream hills are wasted away, the old streams wander sluggishly almost at will along ill-defined courses, slowly doing the little that remains for the completion of their life-work. During the advance of this consideration, specific examples may be given of rivers in one or another stage of development from various parts of the world.

After gaining an understanding of changes in the life of an undisturbed river, the effects of elevation, depression, or deformation of the land, or of climatic changes may be introduced. With their introduction, an important step is taken toward the more complicated conditions of nature; at the same time, the subject becomes somewhat more difficult from the necessity of maintaining a greater number of factors in mind while interpreting the relations of rivers having more or less disturbed development.

The consideration of regions of different structure, and hence of different surface expression, advisably follows the preceding account of river development.

In illustration of what is here intended, reference is made to the group of plains and plateaus, characterized by possessing a horizontally stratified structure. These may be first considered according to the condition of their accumulation; as marine plains, lacustrine plains, fluviatile plains, lava plains, snow plains and dust plains. Second, according to the manner in which those formed under water have become exposed as dry land; as by upheaval from beneath the sea, by down-cutting of lake outlets, by evaporation of lake waters in arid climates, by melting away of the ice barriers of glacial lakes. Third, according to the expression of surface form as dependent on complication of structure, altitude above sea-level, stage of development, condition of climate. Fourth, according to the distribution of plains and plateaus of different kinds; thus we find a young marine plain in Florida, an old marine plain, much dissected, in West Virginia; a young lacustrine plain in Minnesota and Dakota, an older lacustrine plain in the Green River Basin of Wyoming; a young lava plain in the Snake River Basin of Idaho, an older lava plain in West Scotland, and so on. Mountains should receive similar treatment. Features of glacial origin deserve especial attention in the Northern States.

Experience shows that when the subdivisions of the land are thus rationally explained, their peculiarities are much more easily remembered, and their relations to habitation and productions are much more fully appreciated. By comparing this outline with the table of contents in the classic works on Geography by Ritter, Humboldt and Guyot, it will be seen that a new element has been introduced into the science by the modern school. Rational geography has supplanted mere description. The fact that rivers and lakes, mountains and plains, have life histories, and have resulted from far-reaching causes, and are still undergoing change, places geography on a higher plane as a disciplinary study than has generally been recognized.

GEOGRAPHY IN EXAMINATION FOR ADMISSION TO COLLEGE.

One of the most important questions referred to the Conference, relates to the weight to be given to geography in examination for admission to college. In this connection the Conference recommended that colleges should accept as preparatory work in such due measure as a fair estimate of their value shall admit, all studies which the high schools are compelled by their conditions to teach, and that physiography, geology and meteorology should be given values equal to the full extent of the work expended in their pursuit.

To the last recommendation the Minority report takes exception on the ground that the subjects mentioned are too nearly allied.

At a joint session of the Conference on Geography and the Conference on Natural History, held at the University of Chicago, the terms for admission to college were discussed at length, and the following resolution unanimously adopted:

> "Resolved, that it is the sense of the Joint Conference that at least one-fourth of the time of the High School course be devoted to nature studies, and that this amount of preparation be required for entrance to college."

This recommendation does not appear in connection with the published report of the Committee of Ten.

The conclusion in reference to requirements for admission to college, embodied in the above, has important bearings on questions now being discussed in educational societies and college faculties. The conflict between classical and modernized scientific courses is still being carried on, although the end seems near. On one side are arranged those who believe that a liberal education, culture and refinement can only be had by pursuing the traditional routine in which the study of ancient languages occupies a major part; in opposition, are teachers who see in the modern science many branches of study fitted to develop individuality and intellectual independence, as well as to promote culture and refinement.

Those who have taken an active part in modernizing and vivifying geographical science, are of the opinion that in the educational revolution now in progress, it should be placed in the first rank in all grades of study from the primary to the post-graduate. Its claim for such a conspicuous place is, as expressed in the report before us, because it *develops the powers of observation*, *the powers of scientific imagination and the powers of reasoning.*

THE UNITED STATES GEOLOGICAL SURVEY IN 1894.

BY

MARCUS BAKER.

The year 1894 was a noteworthy one for the U. S. Geological Survey. One important event distinguishes it from all previous years. In May, 1894, Major J. W. Powell, who had directed its affairs almost from the beginning, in 1879, resigned, and was succeeded by Mr. Charles Doolittle Walcott. A change of bureau chiefs in Washington is too common an event to be ranked as noteworthy, but with the scientific work of the government the case is different. The retirement in the past, of such men as Henry and Baird from the Smithsonian, Hassler and Bache from the Coast Survey, and quite recently of Mendenhall from the Coast Survey, and Powell from the Geological Survey, profoundly affect the bureaus and work directed by them. The work of scientific research, of enlarging the bounds of human knowledge, is not one that goes by routine. To so direct such work that useful results may be acquired for the people and for science requires peculiar qualities. For the geologic branch of this task the successful director must not only be versed in the knowledge already gained respecting the surface and structure of our earth, must not only know the directions in which new and valuable results are to be sought, but must have wide acquaintance with men and affairs, and be an efficient executive. Looking outward, he must be able to clearly present to Congress and the country results already obtained with clear plans and projects for yet other results to be sought for, and looking inward to the administration of his office he must be able to co-ordinate and harmonize the labors of the various scientific co-laborers who constitute his somewhat "cranky" household.

To clearly place the work of 1894 in its proper setting, it will be found useful to summarize the work from the beginning in 1879, down to July 1, 1894, when the present director, Mr. Walcott, formally began the conduct of its affairs.

The U. S. Geological Survey created by act of March 3, 1879, arose from the consolidation and reorganization of three preexisting surveys, all of which had for a number of years been conducting surveys in the Far West. The first director, Mr. Clarence King, directed its affairs for two years, March, 1879, to March, 1881, when its administrative burden led him to resign, and he was succeeded by Major J. W. Powell, who directed its affairs for 13 years, March, 1881, to June, 1894. Under him the survey began to grow rapidly, too rapidly, his critics said, when the appropriation began to grow. At first its operations were confined to the Far West, to the Rocky Mountains and beyond. But a debate arose in Congress very early as to why surveys and geologic researches made for all the people and paid for by all the people should be restricted to only one part of the country. The survey had been created to investigate "the geological structure, mineral resources and products of the national domain," and the representatives from the Central and Eastern States pertinently inquired whether their part of the United States was not a part of the *national domain*. The outcome of the debate was a decision by vote of Congress that the field to be investigated was not merely the little known West, but the whole extent of the United States. Then, in 1882, work began in the Appalachian Mountains, a region which, despite its long settlement, was hardly so well known geographically and geologically as many of our western mountains.

One of the first and most urgent needs for the profitable and economic prosecution of geologic work is maps, topographic maps, maps showing the configuration of the land surface as well as the towns, roads, water-courses, etc. But to make such a map of the United States on a scale large enough for practical needs is a vast undertaking. The area of the United States, including Alaska, is 3,600,000 square miles, an area exceeding that of all Europe. Geographers had dreamed of a map of this vast territory. Nay, estimates of its cost had been made and submitted to Congress, but the estimated cost was so great as to be prohibitive. One class of people insisted that only a large scale, detailed, accurate and therefore expensive map was worth making. This or nothing they argued. Confronted with this theory the Geological Survey found a condition. Maps it must have for its work, and accordingly under legislative authority it set about making them. The costly methods of the European surveys were inapplicable and were rejected. The elaborate large scale maps of the Coast Survey were not needed for the geological work, and hence the methods used in their production were not adapted to this new need. The old Western surveys of Hayden, Powell and Wheeler had done map work extensively in the West, and from these surveys there came into the Geological Survey a small band of trained surveyors accustomed to rapid, accurate, economic work over large areas. This body of men formed the nucleus of a surveying corps, which under the sympathetic and stimulating guidance and skilful leadership of Major Powell set about the task of adapting and improving old and inventing new methods to hasten and cheapen the mapping of the United States. Various experiments were tried, resulting in rapid and continuous improvements in methods. At the same time map-making went swiftly and merrily on. Many thousands of square miles were mapped each year in the Far West and in the imperfectly known Appalachians, of which there existed only either very general small scale maps or none at all. These Appalachian surveys, undertaken by the U. S. Geological Survey, were on a scale of 1:125,000, or about two miles to one inch, and while the main peaks, ridges, etc., were located by triangulation, the details were shown much generalized, all minute detail being ignored. These maps were hailed with delight by geologists and engineers engaged in studying and developing the region. For projecting railroads, opening new coal fields and iron mines they were repeatedly declared to be of great value. But the education of the map users was rapid, and soon the demand came for more detail and larger scales. The old "battle of the scales," which raged so violently in the Ordnance Survey of Great Britain in the "fifties," raged in a small way in the Geological Survey. In certain areas the scale was enlarged to 1:62,500, or about one mile to one inch, and in the Appalachians an increasing amount of detail was shown on the "two-mile" maps. Thus the later work was more detailed and more precise than the earlier, as has been the history of all national surveys. Then came revision of the earlier work, and in some cases the whole area was gone over again. But the importance of keeping the scale down to the smallest practicable limit has never been lost sight of. And in deciding upon the scales to be adopted much weight has been given to the practical requirements of the Survey itself, and small weight to European or other precedents, because of the very unlike conditions. With enlarged scales comes enlarged cost. The Survey has therefore resisted the pressure for enlarged scales, a pressure which has come both from within and without, and with a few trifling exceptions has published no maps on a larger scale than 1:62,500, or about one inch to one mile.

The total area mapped during the 12 years, 1883–1894, is in round numbers 609,000 square miles, an area equalling about one-fifth of the United States (Alaska excluded), and is comprised in 906 atlas sheets, of which 121 were produced during the fiscal year 1893–'94. The area mapped, depending on various causes, such as the scales used, the amount of money appropriated, etc., has ranged from 15,000 to 82,000 square miles per year.

Progress in topographic mapping during 12 years, 1883 to 1894, is shown in the following table in which the relative amounts on the three scales used are shown by percentages:

YEAR.	SQ. MILES.	PERCENTAGE ON SCALE OF		
		1:250,000	1:125,000	1:62,500
1883	15,000	73	27	0
1884	45,000	53	46	1
1885	57,000	33	63	4
1886	82,000	23	72	5
1887	56,000	25	66	9
1888	52,000	26	67	7
1889	64,000	20	70	10
1890	68,000	0	83	17
1891	65,000	0	74	26
1892	53,000	0	85	15
1893	26,000	0	27	73
1894	36,000	3	31	66

Surveys more or less extensive have been made in nearly every State and Territory. Massachusetts, Rhode Island, Connecticut, New Jersey and Columbia (if the District of Columbia may be so called) are completely mapped. Large tracts have been surveyed in California, Nevada, Utah, Arizona, New Mexico, Montana, Texas, Colorado, Kansas, Missouri and Arkansas. The Appalachian Mountains are nearly all mapped, and considerable tracts are also mapped in Louisiana, Oklahoma, North and South Dakota, Iowa, Illinois, Wisconsin, New York, Maine and Pennsylvania.

The atlas sheets of this great mother map of the country are now to be seen in various public libraries, so that it is perhaps needless to describe them other than to say that they are of uniform size, about 16 by 20 inches, that they are projected without reference to political divisions, that they are printed in three colors, and are designed with a view to make them as legible and as useful as possible, not merely to the geologist and engineer, but to every map user; and this means everybody, for who is not a user of maps?

Thus far we have spoken only of topography and topographic maps, the occasion for this being the large proportion of time, money and energy given by the Geological Survey to this class of work. Why so much energy should be devoted by a geological survey to the production of topographic maps may not be self-evident, and hence a word or two of explanation.

Geology is concerned with the rind or skin or crust of this ball on which we live. Out of this rind come many useful things. The iron, coal and other minerals dug out of it last year were worth 609 million dollars. It is the business of the geologist to study this crust, to map out, *i. e.*, picture out, for *mappa* means a picture, the beds or layers of material composing it, to find out the position and thickness of the beds of limestone and sandstone, of the clays, gravels, coals and ores, of the lavas and granites and the distribution of underground gas, oil, brine and water. For this work maps are of the utmost importance, both for the study and for exhibiting the results of the study. The State geologists who, in various States during the past, and present as well, have prosecuted geologic work, have unanimously regretted the lack of this powerful aid to their work. In European countries this need was never keenly felt since military needs had produced topographic maps before the geologic want was felt. Thus the European geologist found maps ready to hand. In the United States, however, the need of topographic maps has been and is for peaceful rather than for warlike pursuits. It is the geologist and engineer rather than the soldier whose demands have produced such maps as we now have. The Geological Survey, confronted with this need, has proceeded to meet it and to make, under authority of law, a topographic as well as a geologic map, and it is thus in fact though not in name the U. S. Topographic and Geologic Survey.

This need of topographic maps has delayed the production of geologic maps, and it is only in the past year or two that the Survey has been able to conclude upon the multifarious and complex questions which required decision before the publication of the first sheet of the great geological atlas of the United States was possible. Questions of classification could only be adjusted after the collection and comparison of a considerable body of facts, gathered from a wide area. But after much study, after many and lengthened conferences by men of diverse views and experience, after various comparisons and compromises, a system of classification intended for the whole country has been agreed upon, a color and pattern scheme adopted and a beginning made in publication. On the first of July, 1894, five folios had been printed and 39 more were in various stages on their way to final publication, some of them being nearly finished, others barely begun, and still others in various intermediate stages.

The final outcome of the geological surveys and studies of any district are to be shown in what are technically known as *folios.*

To clearly understand what a folio is one should be seen. But as it is impracticable to place a copy in the hands of every reader of this article, the following condensed and imperfect description must be substituted:

A geological *folio* of the U. S. Geological Survey is a large thin atlas in a cover of heavy manilla paper. On this cover is the imprint *Department of the Interior*, *U. S. Geological Survey*, followed by the name of the Director, and then the words *Geological Atlas of the United States.* This is followed by the name of the sheet, such as *Sacramento Sheet*, *California*, or *Kingston Sheet*, *Tennessee*, etc. A skeleton map on small scale shows the general region of country surrounding the sheet, while a shaded area on the skeleton shows the particular spot or area whose topography and geology is exhibited within the folio. A table of contents follows, called *List of Sheets*, usually 7 or 8 in number. Printed on the inside of the cover of each folio is a very simple and elementary description of the geologic map of the United States. It aims to tell in the simplest manner the leading facts about this map. *Explanatory Text* it is called in print, but Kindergarten text is its nickname. It begins "A map showing the watercourses and the unevenness of the surface is a topographic map," and farther on is added "A map showing the distribution of rock masses is a geologic map." This "kindergarten" text is sometimes, though not always, followed by a general account of the geology of the region or district within which the specific sheet lies, a description of its structure and an explanation of its supposed origin and history. This description is aimed at neither the infant nor the philosopher, but is designed for the general reader, and accordingly is as free from technical words as the subject will permit. In the case of the Sacramento Sheet, California, this descriptive text is entitled *Outlines of the geology of the gold belt;* in the Kingston Sheet, Tennessee, it is entitled *Outlines of Appalachian history.*

Of the three groups of text the last is called *Descriptive Text*, and it deals specifically with the atlas sheet which it accompanies. This text is, from the needs of the case, the most technical of all, and yet it is not needlessly technical.

These three groups of text are followed by three, usually or sometimes, four maps, each covering the same area. So many facts are to be shown that if all were printed on one sheet, there would be crowding and obscurity. The first is the topographic map which has already been briefly described. The second is devoted to *Areal Geology*, and by colors and patterns shows the distribution of the various rock masses which form the surface of the country, or rather, perhaps, it should be said of the rocks just beneath the layer of soil made by their disintegration. The third map, entitled *Economic Geology*, is similarly covered over with patterns and bands or patches of color, showing the distribution of rock masses, but differs from the preceding in showing certain ones more conspicuously. The masses selected for emphasis are those with which deposits of known economic importance are associated. Those masses with which worked or workable iron ores are associated are shown in a strong red color; those containing coal, in blue; those containing gold, in yellow, etc. The fourth map is entitled *Structure Sections*. If the reader will imagine a trench half a mile or more deep, with vertical walls, to be dug across the country shown on the map, and then take an imaginary walk through this imaginary trench, looking at its walls, he will see, in imagination, what the geologist is trying to show in this structure section map. He will get a side view, as it were, of the crust, or of the skin on the crust. He will see whether the rock masses are beds of coal or limestone or sandstone, and whether they are lying level or sloping or are bent, folded or irregularly twisted or crushed. The last leaf of this folio is a diagram entitled *Columnar Sections*, whereon is shown the geologic age and the thickness of the different rock masses to be found as we go downward into the crust.

This short description must suffice, all imperfect as it is, and as, indeed, it would still be, though it were longer and better. It will have served an useful purpose if it quicken some reader's curiosity to call at his nearest public library and see for himself.

The long and laborious work preliminary to beginning the publication of these folios is now accomplished. Publication has actually begun and is going forward with increasing speed. More than 100 manuscript sheets are in hand and the work of publication is in progress on nearly two score of them.

This article has already grown to its full limit, and I therefore hasten to conclude.

During the year 1893–'94 the Geological Survey published its usual annual report and its usual volume on what is colloquially known as *mineral statistics*, but officially as Mineral Resources of the United States. The total value of the mineral products for the year was $610,000,000. It published 3 monographs and 17 bulletins, ranging from a thin paper-bound pamphlet to a stout quarto volume. It engraved and printed 69 topographic maps and 5 geologic folios. It made 192 chemical analyses. It increased its library, almost exclusively by exchanges, from 104,000 to 110,000 pieces (books, pamphlets and maps), and now has a collection of works on geology in general and of the United States in particular that is without an equal.

And lastly, it has a new director selected from its own corps for merit alone, and who succeeds an older, a skilful and a successful leader. Thus he is exposed to criticism by contrast. That such criticism has not come is one of the strongest evidences of the wisdom of the choice and one of the best auguries for the future.

MARCUS BAKER.

GEOGRAPHICAL WORK IN CANADA, 1894.

BY

DR. GEORGE M. DAWSON.

The government organization in Canada most immediately connected with the mapping of the country as a whole is the Dominion Lands Survey, its field of operations being the Northwest Territory with Manitoba, the "railway belt" in British Columbia, and generally all parts of the Dominion not included in the several older provinces.

The main object of this survey, as its title implies, has been the blocking out and subdivision of the public lands of the Dominion, but extended exploratory surveys have also been carried out, as well as, in late years, topographical surveys in the Rocky Mountain region. In 1894 a new departure has been made in the direction of irrigation surveys, including accurate lines of levelling and the gauging of rivers and streams. These surveys are intended eventually to include a large tract of south-western Alberta, embracing the foot-hills of the Rocky Mountains, and a considerable width of the adjacent plains, where the rainfall is in many years insufficient for the proper growth of crops, although the soil and other conditions are of the most favourable. This work is being carried out under Mr. J. S. Dennis. The general plan pursued is, to cover the country by a primary net-work of levelled lines following the main lines of the land surveys, and establishing permanent points of reference at township corners, river crossings and other convenient places. In this way a satisfactory basis, and one referred to a common datum, will be laid down, to which all local irrigation surveys may be attached.

In 1894 the Hydrographic Survey of the Canadian portion of the Great Lakes was continued by Mr. W. J. Stewart, under the Department of Marine, and the work in Georgian Bay and the "North Channel" of Lake Huron was completed. One additional chart, based on this work and published by the British Admiralty, has been issued, and it is hoped soon to issue a complete chart of the "North Channel." Also under the Department of Marine is the Tidal and Current Survey which is now being actively prosecuted on the Atlantic Coast by Mr. W. B. Dawson.

Surveys of the region traversed by the Canada-Alaska boundary were continued during the summer of 1894 under Mr. W. F. King and Professor T. C. Mendenhall, Commissioners appointed for that purpose by the Governments of Great Britain and the United States respectively. The delineation of the country through which this line is to be defined, may now be considered as almost completed, from the southern extremity of the line to the point at which it reaches the 141st Meridian. Seven Canadian parties were in the field, under the general superintendence of Messrs. Wm. Ogilvie and O. Klotz. The photo-topographical method has been throughout employed successfully in these surveys, and by its means nearly 10,000 square miles of rough and inaccessible mountain country have been laid down during the past season by the Canadian contingent.

Although secondary to its main objects, a more or less considerable amount of geographical work is necessarily undertaken each year by the Geological Survey of Canada. The field of operations of this survey extends to all parts of the Dominion, including the various provinces as well as the unorganized territories. Even in the older provinces it is usually found requisite to add much to the existing maps in order to render them suitable as a basis for the representation of the geological features; while in the more remote districts through which lines of exploration are carried, it is often necessary to devote as much time to geographical as to geological work, the rivers, lakes and astronomical positions being laid down and determined for the first time. In either case, both classes of work have as a rule been undertaken and carried out concurrently, either by the geologist himself or under his immediate supervision.

In 1894 the more important exploratory surveys in Canada, from a geographical point of view, have been two conducted by the Geological Survey, and of these it is proposed to give a few more detailed notes.

In 1893, Mr. J. B. Tyrrell, of the Geological Survey, carried a reconnaissance survey from the east end of Athabasca Lake across the "Barren Lands" to the head of Chesterfield Inlet, returning along the west coast of Hudson Bay. The most detailed account of this interesting journey which has yet been published appears in the November (1894) number of the *Geographical Journal* (London). In 1894 the same gentleman was commissioned to examine and survey a second line through the great region to the west of Hudson Bay. In this expedition he was accompanied by Mr. R. Munroe Ferguson, the party consisting besides of four men, with two canoes. The unexplored country was this time entered from the north end of Reindeer Lake, of which the waters are tributary to the Churchill River. Under the guidance of two local Indians, Ice River was followed up for seven days, to a portage route which led through Thanout and Theitaga Lakes, to a lake at the head of Kazan or White Partridge River, in north latitude 60° 10′. From the head of Reindeer Lake to this point, no less than fifty-three portages had to be made, with an aggregate length of more than fifteen miles.

The Kazan River was then descended for a short distance, to Ennaida Lake, on the edge of the "Barren Lands," where the Indian guides turned back, having no knowledge of the country beyond. The river still maintained its northward course, however, and after some time a camp of Eskimos was fallen in with, and two men were again procured as guides, thus relieving the party of any uncertainty as to the route. For two weeks the river was followed down and surveyed, and the western shore of the large Yath-kyed Lake, through which it flows, was also examined.

Although far inland, numerous camps of Eskimos were passed during this part of the journey, these people here living entirely upon the cariboo and seldom visiting the coast.

When in latitude 63° 7′ it was definitely ascertained that the Kazan River flows into the head of Chesterfield Inlet, but that by means of a series of long portages another river might be reached which enters Hudson Bay much further south. Various considerations, including the lateness of the season, appeared to Mr. Tyrrell to render the last-named route preferable, and with the help of seven Eskimos the canoes and outfit were conveyed across these portages, and the shore of the bay was reached on September 18th, in about latitude 62°. Favoured by good weather, the party then proceeded southward along the west shore of the bay, and attained Fort Churchill on October 1st. From this place, after waiting for the full onset of winter, the return was made overland and along the ice of Lake Winnipeg to Winnipeg City. As a result of Mr. Tyrrell's work in this region in 1893 and 1894, it will now be possible to revise the geographical outlines of the great system of lakes and rivers of the "Barren Lands," which on all previous maps has appeared in the vaguest possible manner, after Hearne, who wandered through this country in search of the Coppermine River more than a hundred years ago. We are also now furnished with the main geological features of this tract of country, which is found to include, besides the Archæan rocks, a large area of Lower Cambrian.

A second important exploration, also carried out under the auspices of the Geological Survey, is that of the interior of the Labrador Peninsula by Mr. A. P. Low, assisted by Mr. D. I. V. Eaton. In 1893, Mr. Low had crossed from Mistassini Lake to the upper part of the Koksoak or Ungava River, which was followed down and surveyed to its mouth in Ungava Bay. It had been intended to spend the winter here, but the scarcity of provisions led Mr. Low to embrace the opportunity of a passage by the Hudson Bay Company's steamer to Hamilton Inlet, on the east coast of Labrador, and the company's post at the head of this long inlet was adopted as a base for further work. In order that surveying operations in the interior might be carried on successfully during the ensuing summer, it was necessary beforehand to establish a depôt of provisions as far inland as possible. Before the Hamilton River closed in the autumn, four Indians were sent up with loaded canoes to establish a cache. They reached a point about 100 miles from the coast, returning afterwards on the ice. In January Mr. Eaton and a party of men with sleds established a second cache about seventy miles up the river, and on March 6th a final start was made. Till May 19th, the party was continuously engaged in the arduous work of carrying on the supplies and outfit, which were thus advanced to a point on the plateau of the interior of peninsula above the Grand Falls. A continuous survey of the route had also been made to this point, where, after a delay of ten days, during which the ice broke up on the lakes and rivers, the exploration by water began.

The Grand Falls, it will be remembered, were visited by Messrs. Bryant and Kenaston and by the Bowdoin College party in 1891, being the terminal point of both these expeditions. Mr. Low writes: "These falls are probably the highest and grandest in America. The river here rivals the Ottawa in volume, and has a total fall of eight hundred feet in eight miles, with one sheer drop of three hundred feet where it descends from the table-land into a narrow cañon, with perpendicular rocky walls, through which it rushes for five or six miles, until it runs out into the wider and older valley."

On reaching Sandy Lake, where the south and west branches of the Hamilton unite, it was decided to employ this as a centre from which to carry on the work, and here the greater part of the stores were cached. The west or Ashounipi Branch with numerous connected lakes, was first examined; after which, again starting from Sandy Lake, a trip was made to Michikamow Lake, from which the

Northwest River flows. It was found to be about the same size as Lake Mistassini, but almost free from islands.

After returning to Sandy Lake, this place was finally left on August 1st. The route followed was by the south or Attikonok Branch of the Hamilton, to its head in a lake of the same name. Thence across the height of land to the Romaine River, which was descended nearly 200 miles, when a portage route was followed westward to the St. John River, by which the shore of the Gulf of St. Lawrence was eventually reached not far from Mingan.

The results of Mr. Low's work in 1893 and 1894 include the survey of over 2,000 miles of rivers and lakes in the interior of the Labrador Peninsula, combined with a geological examination of all the routes traversed. While, as heretofore supposed, the region as a whole is characterized by Archæan rocks, a very important area of Lower Cambrian, with a probable length of 500 miles, has been discovered and in part outlined. These rocks are rich in ores of iron. Observations of much importance in relation to the glacial period have also been obtained.

Although carried out in 1893, mention may in conclusion be made of an interesting piece of exploration in the Rocky Mountains by Professor A. P. Coleman, of which a short account and map have lately appeared.* This was directed to the sources of the North Saskatchewan and Athabasca Rivers, with the special object of visiting Mounts Brown and Hooker, which have for many years been credited with being the highest summits of the Rockies. Professor Coleman states that the position assigned to Mount Brown on the maps is occupied by a comparatively insignificant mountain of about 9,000 feet in height. It proved somewhat difficult to recognize Mount Hooker, but in the vicinity in which it is indicated there are several summits estimated at from 11,000 to 13,000 feet in height.

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* The Geographical Journal, London, Volume V, No. 1.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

A WORLD'S EXHIBITION AT AMSTERDAM.—There will be opened at Amsterdam, in May, a World's Exhibition of Hotel Equipment and Travel.

The Committee of Advice to Group XI (Geographical Department), under the presidency of the distinguished geographer, J. Æ. C. A. Timmerman, makes the following announcement:

> It is therefore our purpose to form, as far as possible, a complete collection of everything illustrative of travelling, in its historical development.
>
> While exhibiting therefore all those modern means of conveyance, which are at present more and more nearing perfection, ample space will be reserved for exhibits representing the ancient and original means of conveyance and auxiliaries of travelling; as well as for ancient maps, charts, atlases, itineraries and illustrated works, accounts of travels and journeys, logbooks, instruments, models, drawings, etc.

SOCIÉTÉ DES AMIS DES EXPLORATEURS FRANÇAIS.—This society, authorised by decree of July 20, 1894, is established in Paris, at the house of the *Société de Géographie*, 184, boulevard Saint Germain.

Membership is open to every person who has attained the age of 21 years, without distinction of sex or nationality, on payment, once for all, of 100 francs.

The Society does not propose to found or to direct any scientific publication; nor will it form a library or make collections. Books, maps, photographs, or other documents, presented to it, will be made over to the *Société de Géographie.*

Specimens of natural history, ethnographical, and other special collections will be delivered to the State museums.

Gifts of instruments, arms, camping utensils, and other articles for the use of travellers and explorers, will be accepted.

Assistance will be rendered to travellers according to the nature of the case: by the loan of instruments, etc.; by subsidies to facilitate the immediate use of results, such as scientific observations, itineraries, and the like; by participation in the cost of production of books, maps, drawings and pictures; and finally, by advances which shall leave the explorer free to care for his health, without anxiety as to the means of existence.

LES NOUVELLES GÉOGRAPHIQUES, hitherto published in separate form as a supplement to *Le Tour du Monde*, ceased with the year 1894. Its place is supplied by *À Travers Le Monde*, which appears under the same cover with each number of *Le Tour du Monde*, but with its own paging.

CASSINI DE THURY.—The *Société de Topographie de France* has undertaken to raise a monument to Cassini de Thury, the author of the first great topographical map of France, and to publish a detailed account of his labours. A considerable sum of money has already been collected for the monument, and the *Société* has addressed to the geographical societies throughout the world a list of questions for studies on the history, progress and completion of the great work, its relation to similar enterprises in France and in other countries, etc.

THE ITALIAN GEOGRAPHICAL SOCIETY, on the 1st of January, divided its publication into two parts, the *Bollettino*, to be issued 12 times in the year, and resembling in character and contents the *Comptes Rendus* of the Paris Society and the *Verhandlungen* of the Berlin *Gesellschaft;* and the *Memorie*, which will contain the longer papers communicated to the Society, and will appear from time to time, as occasion serves.

A BELGIAN ANTARCTIC EXPEDITION, planned by Lieut. de Gerlache, is in process of organization at Brussels, but cannot take definite form until the return of M. de Gerlache from a sealing voyage to Jan Mayen on board the *Castor*, a Norwegian vessel which left Sandefjord early in March.

A SPECIAL NUMBER (13) of the *Annales de Géographie* is devoted to a Bibliography of the year 1893. This useful list includes pamphlets and articles published in magazines, as well as books and maps, arranged in two divisions: one embracing Physical Geography, Ethnography, Oceanography, and other general subjects; the other, works on the different parts of the world and their subdivisions. Occasional critical remarks add to the value of the record.

In a multiplicity of details there is always room for error, but it is, surely, by a perverse chance that, on p. 47, a note on Judge Daly's article, *Have we a portrait of Columbus*, makes him say in French the exact contrary of his plain statement in English. Alluding to the Lotto portrait, Judge Daly wrote:

> It is not a satisfactory picture upon which to found the belief that it is a likeness of Columbus, and it is greatly to be regretted that the United States Government, in commemoration of the Centennial year, should have stamped it on two millions of

the silver currency of the country, and engraved it upon the postage stamps as a reliable representation of the person of the great discoverer. (*Bulletin Am. Geog. Soc., 1893, No. 1, p. 63.*)

It should seem to be impossible to misunderstand the sense of this passage, but in the note referred to the feat is done in this style:

> *Of these (reputed portraits) there is one, however, which he (Daly) regards as more verisimilar than the others: it is the one which served as a model for the postage stamps specially issued on the occasion of the 4th centenary.

THE SOURCE OF THE MISSISSIPPI.—The *Revue de Géographie*, for January, publishes an article by M. E. Levasseur,† of the Institute, based upon Mr. J. V. Brower's volume, *The Mississippi River and Its Source.* This article is necessarily a résumé of the data brought together in Mr. Brower's history of the river and its exploration; and with this work, as M. Levasseur says, the debate concerning the source of the Mississippi was brought to a close. None the less, he briefly notices Captain Glazier's long-continued and temporarily successful effort to assume the character of a discoverer. The paper closes with a philosophical reflection:

> Mr. Brower's exploration leaves no room for controversy. Glazier's attempt will have had the good result of hastening the conclusion and of enriching geography with the definitive map of the cradle of one of the world's great rivers. In this regard social sciences may envy the natural sciences. How happy would not the former be thus to put an end to discussion, and to enlighten public opinion by the demonstration of the fact, without leaving any dark corner in which error could still abide, and from it come forth into renewed activity!

THE ALASKA BOUNDARY MEASUREMENT IN 1893 is the subject of a paper by A. Lindenkohl, of the U. S. Coast and Geodetic Survey, in *Petermanns Mitteilungen*, Band 40, No. XII.

The work to be done was the survey of a strip of the coast, 30 geographical miles in width, between Portland Inlet on the south and Lynn Channel on the north. This strip covers the territory claimed by the United States as defined in the Anglo-Russian treaty of the year 1825. The task was divided into two parts, the Americans devoting themselves to the survey of the river valleys and the Canadians to that of the higher ground.

Three streams, rising in British Columbia, find their way to the sea across this district: the Unuk, the Stikine and the Taku. Of these the Unuk, the most southerly, is also the least important. It flows south-westerly into Burrough Bay at the head of Behm Channal. In June, 1893, its current was so strong that it was with the greatest difficulty the canoes made head against it. Ordinarily the Unuk is cut up into narrow channels, separated by islands and sand banks, and its valley, which has a width of from a half-mile to a mile, is thickly wooded with alders, poplars and willows. The steep sides of the valley rise to an elevation of 3,000 feet and are clad with pines and cedars, and the crest of the mountains, at a distance of about two miles from the valley, reaches a height of from 4,000 to 6,000 feet.

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*Il y en a un cependant qu'il considère comme plus vraisemblable que les autres: c'est celui qui a servi de type pour les timbres-poste spécialement édités à l'occasion du 4e centenaire.

† M. Levasseur's paper is an extract from the *Bulletin de géographie historique et descriptive*, communicated to the *Revue de Géographie* by authorization of the Minister of Public Instruction.

The Stikine is perhaps, after the Yukon, the best-known and most important river of Alaska. In 1863 it was navigated only by the Indian canoes, and in those days many Indians and white men lost their lives on their way to the gold-diggings in the so-called Little Cañon, 80 miles from the mouth of the river. Now there is during the summer months regular steamboat communication between Port Wrangell, at the river-mouth, and Telegraph Creek, 45 miles above Little Cañon, and a pack-road unites this place with the head of Dease Lake, the central point of the Cassiar gold-district. From Telegraph Creek the Stikine flows first in a south-westerly, and then in a southerly direction, as far as the Great Bend, 25 miles above the mouth; it then turns to the west and finds its way to the sea through the Coast Mountains, which are between 6,000 and 7,000 feet in height. The valley of the river is nearly two miles wide, cut up by channels and heavily timbered, like that of the Unuk. It is shut in on both sides by steep walls of rock, covered with forests up to 2,500 feet and rising in regular slope from 500 to 1,500 feet beyond that elevation. The line of perpetual snow varies between 3,000 and 4,000 feet, according to the direction and inclination of the surface, and many of the steep higher points are bare of snow. Visible in every direction are sharp peaks, of from 5,000 to 10,000 feet in altitude, and Kate's Needles, the highest of five that were measured, was found to be 2,912 metres (9,554 feet) above the sea. The glaciers of the lower Stikine come down to the valley and almost to the sea-level. Four of these, on the north-western bank of the river, are named in order from the mouth up-stream, Popoff Glacier, Great Glacier, Mud Glacier and Hood Glacier; and there are many others on both sides of the river. Several members of the expedition expressed the opinion that every stream in this region had its origin in a glacier, and both tradition and observation confirm the belief that there is a steady retreat of the ice-masses.

The climatic conditions were peculiar. Those of the party who were stationed at the mouth of the river had to endure almost uninterrupted rainy weather, while those on the boundary, only 30 miles away in a straight line, enjoyed warm weather with a clear sky; the explanation being that the sea-breeze parts with its moisture in passing over the Coast Range.

Here, as elsewhere in Alaska, fish abound, but, with the exception of brown and black bears, there is very little game. The land is divided into hunting districts, allotted to the various Indian tribes, and white men are forbidden to kill game within these precincts.

Every handful of earth from the river-bed shows traces of gold, and there was a time when the placer-washings were profitable, but now the worker could not make a dollar a day.

The Taku is not much inferior to the Stikine in length and volume of water, but it has attracted little attention.

It is formed by the junction of a northern and a southern branch, and flows in a south-westerly direction, for more than 40 miles as a true river, and for 18 as the fiord-like Taku Inlet, and empties into Stephens Passage, not far from the little city of Juneau. The survey included about half the course of this river, from the mouth to the junction of the two branches. The characteristics of the valley are similar to those of the Stikine, and there was no difficulty in ascending or in descending the river, the strong sea-breeze blowing constantly up-stream and the rapid current helping the descent. Dr. C. Willard Hayes, who was geologist of the Yukon Expedition in 1891, believed that light-draught steamers could ascend to the mouth of the southern branch, and that a pack-road, made from that point to the Ahklen Lake, and thence to the Yukon, would offer decided advantages over the one now in use by Chilkoot Pass.

The mountains in sight from the Taku valley appeared to be somewhat lower than those seen from the Stikine.

Four large glaciers descend to the level of the valley on Taku Inlet and the river; these are the Windham, the Foster, and the Twin glaciers on the north side, and the Wright on the south; and the north-western angle of the Inlet is generally filled with floating ice from the Foster glacier. These would all attract much more attention, were they not in the immediate vicinity of the famous Muir glacier, but the magnificent ice-walls of the Foster are within a pistol-shot of the sightseers on the excursion steamer.

Geologically, the greater mass of the Coast Range is composed of grey granite rocks, containing quartz, orthoclase, biotite and hornblende.

Mr. Lindenkohl's paper closes with some particulars concerning the measurement of Mt. Logan. This peak is in the British territory, 43 kilometres (26.72 miles), north-east of Mt. St. Elias, in N. Lat. 60° 34′ 1″, W. Long. 140° 23′ 49″. Two independent measurements were made, differing only 17 feet, and the accepted elevation is the mean of the two.

The altitudes of eight mountains were computed, as follows:

Mt. Logan, 19,514 ft. (5,948 metres).
Mt. St. Elias, 18,015 ft. (5,491 metres)
* Mt. Vancouver, 15,665 ft. (4,477 metres).
Mt. Cook, 13,759 ft. (4,194 metres).
† Mt. Augusta, 16,920 ft. (4,243 metres).
Mt. Newton, 13,778 ft. (4,199 metres).
‡ Mt. Huxley, 11,070 ft. (3,631 metres).
§ Mt. Hubbard, 10,068 ft. (3,373 metres).

MR. PEARY'S WORK IN GREENLAND.—M. Charles Rabot, in an article on Recent Arctic Explorations, printed in the *Comptes Rendus* of the Paris Geographical Society (1894, pp. 428–437), briefly reviewed, in a strangely unworthy spirit, Mr. Peary's two expeditions to Greenland. Of the first (1891–1892) M. Rabot had this to say:

> ‖ Two accounts of this exploration have been published: one in the *Geographical Journal*, compiled from Mr. Peary's notes; the other by his only companion, Mr. Astrup, in the Year Book (No. 4) of the Christiania Geographical Society. These two documents and the maps which accompany them present contradictions which singularly weaken the authority of the journey. The map in the *Geographical Journal* establishes the insularity of Greenland. . . . Astrup's map is completely different. . . Moreover, Astrup's report formally contradicts that of Mr. Peary. "We recognised," writes the former, "the probable extension of Greenland towards the north."

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* 15,665 feet=4,775 metres; 4,477 metres=14,689 feet.
† 16,920 feet=5,157 metres; 4,243 metres=13,921 feet.
‡ 11,070 feet=3,374 metres; 3,631 metres=11,913 feet.
§ 10,068 feet=3,069 metres; 3,373 metres=11,066 feet.

‖ Sur cette exploration deux relations ont été publiées: l'une dans le *Geographical Journal* rédigée d'après les notes de M. Peary, la seconde dans *l'Annuaire* (IV) de la Société de Géographie de Kristiania écrite par M. Astrup, l'unique compagnon de M. Peary dans cette expédition. Ces deux documents et les cartes qui les accompagnent présentent entre eux de graves contradictions qui affaiblissent singulièrement l'autorité du voyage. La carte du *Geographical Journal* établit l'insularité du Grönland. . . . La carte d'Astrup est complètement différente. . . . D'autre part, la relation d'Astrup contredit formellement celle de M. Peary. "Nous avons reconnu, écrit-il, l'extension probable du Grönland vers le nord." . . .

M. Rabot must read and judge for himself; but some obvious reflections should have occurred to him, when he undertook to weigh the testimony before him. Mr. Peary, a man of proved capacity and honour and experience, was the leader of the expedition and responsible for its result. There was no responsibility laid upon Mr. Astrup. He was free, if no scruple withheld him, to utter himself in any way that seemed likely to bring a temporary distinction to so young a man. He chose his time well, for his report and map were published when Mr. Peary was again in the frozen North, far beyond the reach of communication for an indefinite period; and this should have given occasion for doubt, if not for suspicion, in a critical mind.

M Rabot quotes, with peculiar simplicity, the words of Astrup:

> We recognised the probable extension of Greenland towards the north.

Where and when did Mr. Astrup receive his authority to put these words into Mr. Peary's mouth?

M. Rabot's account of the expedition of 1893–1894 is even less creditable to him. He describes the attempt on the inland ice and its failure, and adds:

> * During this time Mr. Astrup, who had followed Mr. Peary in this second journey, explored in a sled the north-west coast of Greenland as far as Melville Bay in the south, and surveyed 300 kilometres of coast previously unknown. This topographical survey is the principal geographical result of the expedition. . . .
>
> In this expedition, as in the preceding one, Mrs. Peary accompanied her husband, and a woman cook was also of the party. This circumstance did not contribute to maintain harmony among the explorers. On the other hand, the provisions were composed, in part, of spoiled canned goods, and this negligence produced the most regrettable consequences.
>
> The checks encountered by the American polar explorations are generally due to faults of organization and equipment. . . .

However it may be with the Americans, it is certain that M. Rabot's misstatements are due to rashness and an unfortunate habit of mind. His errors have been corrected by Prof. William Libbey, Jr., in a letter printed in the *Comptes Rendus* for 1895, pp. 28–30, to the following effect:

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* Pendant ce temps, M. Astrup, qui avait suivi M. Peary dans ce second voyage, explorait en traîneau le littoral nord-ouest du Grönland jusqu'à la baie Melville dans le sud, et relevait 300 kilomètres de côte jusqu' ici inconnus. Ce levé topographique est le principal résultat géographique de l'expédition. . . . Dans cette expédition, comme dans la précédente, Mme. Peary accompagnait son mari; une cuisinière faisait également partie de la mission. Cette circonstance n'a pas eu pour effet d'entretenir l'harmonie entre les explorateurs. D'un autre côté, les approvisionnements étaient, en partie, composés de conserves avariées et cette négligence a eu les conséquences les plus fâcheuses.

C'est généralement à des vices d'organisation et d'équipement que sont dûs les échecs des explorations polaires américaines. . . .

> It would be premature to express a positive judgment with regard to the contradictory opinions uttered by Lieut. Peary and Mr. Astrup; but I should incline to accept, without much hesitation, those of Lieut. Peary concerning the insular nature of Greenland, for he is a man of great experience and competent in geographical observations.
>
> I should accept with even less confidence the points indicated by Mr. Astrup on his chart of Melville Bay. They are based on too small a number of angles and taken from only two positions in the bay, towards the shore which surrounds it. The panoramic views which he is to publish are a presentation somewhat similar to the shape of the coast, but nothing more. This work, performed after the return from the expedition to the interior glacier, is confined to Melville Bay alone and gives no idea of the northwest coast, as the article (of M. Rabot) affirms. Furthermore, it is not correct to say that this document is the only one, or even the most important one, of the expedition; it is, on the contrary, decidedly inferior to the thoroughly accurate work of Lieut. Peary on Inglefield Gulf, of which he has made the first complete chart. . . .
>
> I regret that the author of the article expressed himself as he has done concerning the presence of Mrs. Peary and the woman who accompanied her to take care of the little child, which was not yet born when she left the United States. Mrs. Peary showed herself much more capable of performing the voyage than several members of the expedition. Far from being an obstacle, her presence was an encouragement *until after* the return from the inland ice. It was then that the men began to show their discontent, and the animosity of some among them went so far that they would no longer eat at the same table with Mr. and Mrs. Peary. At the last, a conspiracy was formed with the intention of *abandoning* Lieut. Peary, and this would have succeeded, if he had not persuaded one of the malcontents to remain with him and his coloured man, Matt. Henson.
>
> So far from the provisions having been bad, there was an abundance of nourishing food, as I know from having tasted it. It was as good as that of our own ship, and we did not find any fault. No polar expedition has been better equipped than that of Lieut. Peary. . . .

GREENLAND FOR ART.—Julius von Payer, the surviving commander of the Austrian expedition which discovered Franz Josef Land, has planned what he calls an Artistic Expedition to the North Pole, by which is to be understood the East Coast of Greenland.

Painters are asking, he says, for new material on which to exercise their art, and he has determined to lead them to the wealth of beauty and of colour in the far north, where the picture of nature was ever entrancing to him during the years he spent in those regions. His plan, as described in the *Geographical Journal* for February, is to build a steamer of 400 tons, to be manned by Dalmatian seamen, with three officers, besides experts, engineers, Tyrolese marksmen, two landscape-painters, one animal-painter, and a photographer. A studio will be erected at winter-quarters, and movable glass studios for use on deck and in special localities will also be provided; all furnished with means of heating and with electric light. Besides the studios, there will be a captive balloon. Payer's experience is that, even with a temperature of 50 degrees below zero, drawing can be done by the hour, and by moonlight or the northern light, as well as by day. The studios will afford protection for painting. Meteorological and magnetic observations will be made by the naval officers, while the naturalist collects specimens and the Tyrolese take care of the game.

Cape Franklin, at the entrance of Kaiser-Franz-Josef Fiord, recommends itself as the finest winter-quarters.

The expedition, which is to be sent out by Austria-Hungary, will start in June, 1896, if all goes well. The cost is partly covered, and Payer's enthusiasm is great enough, it may be hoped, to do the rest. His expedition, whatever may be thought of its value for art, must add to our knowledge of Greenland.

An Excursion in Labrador.—Mr. Charles E. Hite describes, in the *American Naturalist* for February, some explorations made in Labrador in the summer of 1894 by himself and Messrs. Howard Bucknell, G. H. Perkins and G. M. Coates. The party left New York in the steamer *Miranda*, which met with an accident and put in for repairs at Cape Charles, on the southern coast of Labrador. Here a few days were spent in making collections. The country is composed of low hills of granite, syenite and hornblende and there are remarkable examples of anticlinal and synclinal strata on the eroded surfaces of the nearly perpendicular cliffs along the shore. There are almost no trees, but the mosses are in profusion and reindeer-moss abounds.

From Cape Charles the party went to Separation Point, between the White Bear and the Eagle rivers, and started in two small boats to explore the former. On the second day they came to a cataract, 60 feet in height. At the foot of the fall a camp was made and two of the party remained, while Mr. Perkins and Mr. Hite went on, for a distance of 190 miles from the river-mouth. The stream was shallow, with many rapids, and frequently the water would not float the boat. After passing a rapid (called *rattle* by the Labradorians) there was usually an expanse of water for some distance. These broad stretches are called *stiddies*. At fifty miles from the coast, the banks of the river rise into hills, 1,400 to 1,600 feet in height. These are covered with spruce and tamarack, and occasional clumps of birch trees, and with beds of moss from a foot to three feet in depth. The dwarf cornel (*cornus canadensis*) abounds. The bed and sides of the stream were lined with erratic boulders, principally of labradorite. These increased in numbers as the river was ascended; the forest trees disappeared and the mosses became more scanty. After the first fifty miles there were no signs of animal life. The river source was in a chain of small lakes and on the banks grew willows, all bent down stream, the scratches on the bark indicating that the water had risen in the spring to a height of eighteen or twenty feet. In the lower portion of the river were peculiar semicircles of boulders of all sizes, transported by the ice in the spring and dropped in this fantastic position by eddies.

The Eagle and the Paradise rivers were next explored. The former is much deeper and narrower and more rapid than the White Bear and only half as long. The Paradise, which was ascended for forty miles, is very broad in comparison with the others, and it flows through a more level country, which has many plants not found in the hilly districts, and in the broad lakes there were water-birds not before seen on the trip. A dense growth of willow lined the banks. The water abounded with trout and salmon, and seals were found all along the river.

On the north side of Sandwich Bay is a mountain, 1,900 feet high, where several specimens of the caribou were secured. The principal rocks are hornblende, gneiss, syenite and granite. Veins of mica were found, besides iron ore in great quantities and malachite and many crystals of garnet. An outcropping of labradorite measured forty-two feet in length and three feet in width. Glacial striations with a southeasterly direction were discovered in several places around Sandwich Bay and on each of the rivers.

According to Mr. Hite, there are but few full-blooded Eskimos in southern Labrador, the inhabitants being a mixture of the Eskimos with various peoples, mainly English and Danish. To the question of the relationship between the Labrador and the Greenland Eskimos, Mr. Hite contributes an original observation on the flaps, or coat-tails, of the *timiak*, or coat. In Labrador, the front flap is but a few inches in length, while that at the back hangs down to the knee, and both are merely ornamental. The Greenland Eskimos, on the contrary, tie the two flaps together between the legs for protection against the cold. It occurred to Mr. Hite that the Eskimos, in travelling northward, conceived the idea of tying these flaps, and as the people parted company and split into sections, one retained the flaps for ornament and the other preserved them for practical purposes.

There have been clearer explanations. It is conceivable that a Greenlander may have discovered the art of warming himself by tying his coat-tails, but the invention was surely not beyond the scope of a Labrador genius, already provided with flaps. Another explanation suggests itself. It appears that the Greenland Eskimos are intensely practical, while those of Labrador have the artistic and poetical temperament. May not the flying flaps of the Labrador man be worn in mournful memory of the sectional split which divided him from his Greenland brother?

DETERMINATION OF LEVELS IN RUSSIA.—M. Venukoff communicates to the *Revue de Géographie*, for February, the results of the labours of the Russian General Staff in determining the level of European Russia. The final *catalogue* is the work of Col. Rylké, who has drawn up a list of 1,090 stations, the precise elevation of which was measured by several officers, with the same instruments and by the same method.

The lines of operation were distributed along the railways from the Baltic to the Black Sea and along the Ural River. At seven points the Russian operations were connected with the German and the Austrian.

The total length of the surveys exceeds 13,000 kilometres (8,080 miles), and more than 11,000 kilometres (6,835 miles) were twice measured. Solid monuments were set up at the chief stations of the railway network, to serve as fixed points for future levellings.

Such is the general low elevation of the surface that no one of the positions determined exceeds 338 metres (1,109 feet) above the sea, and the figures range for the most part between 110 and 150 metres (361 and 492 feet).

The most important geographical result of this great survey is the well-ascertained identity of level in the three seas, the Baltic, the Black, and the Sea of Azof; but it has yet to be determined whether this is the same as that of the ocean.

A YEAR'S OBSERVATIONS ON THE PAMIR.—M. Emil Muller sends from Tashkent to the *Société de Géographie*, of Paris, a note on the observations regularly made from September, 1893, to August, 1894, at the Russian post of the Pamir, at the confluence of the Murghab and Ak-Baïtal rivers, in N. Lat. 38° 8′ 30″.7, E. Long. 73° 57′ 0″.5.

The elevation of the post above the level of the sea is 3,700 metres (12,139 feet). M. Muller's table reads (with the addition of the values in degrees of Fahrenheit and decimals of an inch):

MONTHS.	MEAN TEMPERATURE.		PERCENTAGE OF CLOUDINESS.	PRECIPITATION IN		PREVAILING WIND.
	Cent.	Fahr.		Millim.	Dec. of in.	
September...	+8°	46°.40	32	2.0	.0787	South-west
October.....	−1°	30°.20	22	0.0	.0000	do
November...	−8°.1	17°.42	30	0.1	.0039	do
December ...	−12°.7	9°.14	47	4.2	.1653	do
January.....	−24°.9	−12°.82	56	2.8	.1102	do
February....	−17°.8	−0°.04	50	0.9	.0355	do
March	−5°.9	21°.38	44	0.7	.0276	North-east
April	+1°.4	34°.52	44	9.4	.3700	do
May	+5°.4	41°.72	42	12.4	.4881	do
June	+12°.1	53°.78	35	4.7	.1851	do
July	+16°.8	62°.24	50	11.3	.4449	do
August	+13°.6	56°.48	19	0.0	.0000	

According to M. Muller, the Pamir post is, of all the points in the Russian empire, the one which has a climate most nearly resembling that of the Transbaikal region, but its winter is a little less cold and its summer somewhat cooler. The lowest temperature (—44° Centigrade=47°.20 below zero, Fahr.) was recorded in January and the highest (27°.5 Centigrade=81°.50 Fahrenheit) in July. Frosts occur in the early morning in every month. Notwithstanding the high percentage of cloudiness, the quantity of water which falls is surprisingly small, not more than one-seventh of that at Tashkent and only a third of that which falls in the oasis of Khiva, held to be the spot the most poorly supplied in the empire; and the wonder is what feeds the glaciers of the Pamir.

The south-west winds are never so strong as those from the north-east, which frequently blow in tempests; and in August the wind is always gentle and may blow from any quarter.

On the subject of the scanty glacier supply, M. Muller's translator remarks that it gives facilities for the study of ice-strata of a formation much more ancient than those of ordinary glaciers, particularly with regard to the cosmic dust contained in them and the extra-terrestrial materials added to the mass of our globe.

COTTON IN TURKESTAN.—Consul-General Jonas, of St. Petersburg, gives in the *Consular Reports*, No. 172 (for January, 1895), some figures on the growth of cotton in Russian Turkestan. The native variety is of poor quality. It was in 1883 that the American seed was introduced, and the crop from it the next year was 7,000 puds (252,000 lbs.), raised on 205 dessiatines (553 acres). In 1893 the product of American cotton had risen to 2,000,000 puds (72,000,000 lbs.) from 100,000 dessiatines (nearly 270,000 acres).

The quantities carried to the Russian market by the Trans-Caspian railway for the years 1888–1893 were: In 1888, 873,092 puds; in 1889, 1,470,503 puds; in 1890, 2,673,267 puds; in 1891, 2,626,110 puds; in 1892, 3,026,518 puds; in 1893, 3,588,025 puds. The Turkestan product of American and native cotton for 1893 was, therefore, 129,168,900 lbs. Mr. Jonas puts the entire consumption of cotton in European Russia, in 1892, at 13,740,518 puds, and in 1893 at about 2,000,000 puds less.

The table of Foreign Weights and Measures, prefixed to the present Report, would be improved by revision. The foreign words are often misspelled and misplaced, as in *arobe*, said to be used in Paraguay, where no such word exists; the true form, *arroba*, being printed two lines below.

There is a *pie*, of the Argentine Republic, and another, Castilian; not something to eat, but simply the *pié*, or foot, of about 11 English inches. The word should have been translated.

The Russian *dessiatine* is correctly valued at 2.6997 acres, but the Spaniards will learn with surprise that they also have a *dessiatine*, equivalent to 1.599 bushels.

The *klafter*, which is German and Austrian, is entered as Russian, and, generally, things are not what they seem.

TONKIN AND THE RED RIVER.—Lieut. Léon Escande, at a meeting of the Paris Geographical Society in February, described his ascent of the Red River in 1893 in the gunboat *Moulun*, at the season of low water as far as the Chinese frontier, 30 miles to the north of Lao-Kay. The rapids are caused, it appears, by the compression of the river between barrages of rock and banks of shingle, and there is always a deep channel with a swift current. The arrival of the *Moulun* in Yunnan was hailed with satisfaction by the Chinese merchants, and M. Escande, on a second voyage, made the distance from Haiphong to Lao-Kay and back to the sea in seven days. His conclusions were, that by works involving but a moderate outlay the river might be made navigable throughout the year, from the sea to Yunnan, and that by adopting a system of towage navigation might be opened without delay.

A JOURNEY TO MECCA.—M. Gervais Courtellemont went to Mecca in 1894, charged by the Governor-general of Algeria with a mission to the Sherif. He gave an account of his journey at a meeting of the Paris Geographical Society on the 7th of December.

The peril of the enterprise was lessened by the presence of a Mussulman companion, Hadj Akli, an Algerian who had already made twenty pilgrimages to the Holy City; but M. Courtellemont assumed the dress and the character of a poor Moslem, and spent the three days of the voyage from Suez to Jiddah on the deck of the steamer among the traders, and camel-drivers and slaves.

Jiddah, with its excessive humidity, its legions of mosquitoes and its scarcity of water, was an intolerable place, and the Turkish police watched the stranger with suspicion. It was some time before he was asked to dinner, and his clumsiness in handling rice with his fingers did not recommend him. When he got home, Hadj Akli scolded him: "You're not very bright," he said, "you don't even know how to behave yourself at table." In the night his host, Si Ali, came to express his fear that the Frenchman would never get back alive, if he persisted in going on; but two days later the start was made in the afternoon, so as to travel the fifty miles by night and reach Mecca in the morning.

The night was bitterly cold. At six o'clock in the morning the travellers entered the Holy City and picked their way through the myriads of sacred pigeons in the streets to the mosque, where M. Courtellemont made the prescribed circuits of the Kaaba and religiously kissed it. Neither then nor at any time during his stay does he appear to have been in danger.

He found the valley of Muna, where the innumerable victims are slaughtered for sacrifice, not by any means a repulsive place. The winds and a process of nitrification dispose of the remains.

The population of Mecca, exclusive of the garrison, is composed of 80 per cent. Indians and Javanese, 18 per cent. Arabs and 2 per cent. Turks; all supported and well supported by the pilgrims.

Those from Algeria alone numbered, in 1894, no less than 9,000, and each one was required to show, before he was allowed to start from home, that he had 1,000 francs in hand. All this money is left in the Hedjaz, for the pilgrims always return penniless.

The commerce of the Hedjaz is almost exclusively in the hands of the English, for whom the annual pilgrimage is a serious matter of business. M. Courtellemont reports the current belief of the Arabs that the English are on the point of conversion to the true faith, and then, they say, the empire of the world will belong to Islam.

The attempt at disinfection in Mecca, made in 1894 by the erection of a building for the purpose, has failed. The house was about 40 feet square, and wholly insufficient for disinfecting the garments of 250,000 pilgrims, the average yearly number, and it was built in the very centre of the city. It was hardly finished when it was destroyed by the more intelligent of the Arabs.

One by one the forbidden cities of the world begin to lose their glamour.

EXPLORATION IN BORNEO.—A scientific expedition to Western Borneo, undertaken at the close of the year 1893, returned to Europe in November, 1894. The leader of the party was the Swiss naturalist Büttikofer. His companions were Messrs. Van Velthuyzen, Nieuwenhuis, Hallier and Molengraaf. The results of their work are summarised in the *Geographische Nachrichten*, of Basel, 1894, No. 17, pp. 267–269.

The start was from Pontianak, just below the equator. The Kapuas River was ascended beyond Sintang to a garrisoned post named Smitau, which was selected as the central station for supplies and the storehouse of the collections.

Beyond Smitau the river, hitherto broad and stately, became contracted, and with a swifter current, and the country took a more richly varied aspect. Some mountain peaks, such as the Kenepai, were found to attain an elevation of 1,100 metres and more (3,600 feet). At Putus Siban, a village on the upper stream of the Kapuas, the Dutch Resident, Tromp, had called together a number of the chiefs to explain to them the objects of the expedition, and display the stuffed birds and the specimens of snakes and fishes and beetles already obtained. The chiefs were interested and readily offered their support. From this point Büttikofer and Hallier proceeded to the foot of Kenepai, to make zoological and botanical excursions on the mountain. The neighborhood abounded with orang-utans, and on the very first morning Büttikofer, walking near the house in his slippers and night-dress, shot one of them. The six weeks spent on the mountain enriched the collections, and the Dyak children were very useful in hunting for beetles.

Returning to Smitau, Büttikofer's next excursion was to the upper Mandai River, which he ascended, at first in a steam launch and then in a rowboat, as far as Nanga Raun, a little mountain village, consisting of two great houses. One of these rested on no fewer than 568 piles, 5 metres (16 feet) in height; it was 150 metres (492 feet) in length, and enclosed the homes of 39 families.

From this village the next stage led to the mountain Lyang Kulung, reported to be about 6,000 feet high. It proved to be only about 3,700 feet. At the base of it, in a perpendicular wall of rock, was a grotto, where there were many rhinoceros tracks. The rainy weather interfered with the zoological collections, but the plants were all the richer and more numerous.

It was difficult to work through the forest, where the roots of the trees and bushes formed a labyrinth six feet in height above the ground; and everything was covered with a layer of moss so thick that branches not larger than one's finger had the apparent diameter of a man's body. Six weeks were spent on Lyang Kulung.

The original plan was to push to the centre of the island and even to cross it, but the difficulties were many, and the employment of force against the natives was out of the question. Mr. Büttikofer was satisfied with what had been accomplished and returned to the coast.

Further explorations are reported in *Petermanns Mitteilungen*, *41 Band*, *II.* After the return of Messrs. Büttikofer and Hallier, Prof. Molengraaf terminated his geological work by crossing the southwestern part of the island. From Sintang, at the confluence of the Kapuas and its tributary, the Melawi, he ascended the latter to Uln Kowin, whence he crossed the watershed to the source of the Katingan River and descended this to Mendawei, where the river enters the Java Sea. The journey occupied the time from the 15th to the 30th of October. Prof. Molengraaf returned to Batavia by way of Banjermassin.

Shortly before this Capt. Van der Willigen, of the Netherlands-India General Staff, crossed the watershed between the eastern and southern coasts. He also followed the Kapuas and Melawi Rivers, and the Ambalau, the affluent of the latter on the left, as far as the limit of navigation, and from there travelled by the Dayak footpath over a pass of 1,000 feet in height. A little more than a mile from the source of the Benjawe, which flows into the Ambalau, he came to the source of the Mahiko, a tributary of the Kahayan, which empties into the Java Sea. At Tumbang Anoi he met the Dutch Controllers of East and West Borneo, who were holding a conference with Dayak chiefs in order to settle a number of tribal feuds. He then followed the Kahayan for a time, turned eastward to the Barito, and made his way to Banjermassin. His journey lasted from April 11 to the 25th of July.

THE RUSSIANS IN ABYSSINIA.—A scientific expedition to Abyssinia has been sent out by the Russian Geographical Society.

The leader is Lieut. Nicholas Leontief, of the Imperial Guard, and the second in command is Capt. Zvyagin, of the artillery, who will make the astronomical observations and map the country. Dr. Elizeef and M. Agapof will study the geology and make collections in natural history.

From Obok, the French post on the bay of Tajurra, the party will cross to Ankober and Antotto, and thence into Northern Abyssinia and the Sudan.

THE NILE AND THE CORVÉE.—Sir C. C. Scott-Moncrieff, who must be supposed to have spoken with knowledge, opened a lecture at the Royal Institution, on the 25th of January, with these words:

> I am to speak to you to-night of the Nile, and I think I may fairly say it is the most famous river in all the world; famous through all the ages, for the civilization that has existed on its banks; famous for its mystic fabulous rise, about which so many sages and philosophers have pondered; famous for its length, traversing one-fifth the distance from pole to pole; famous, and apparently destined to be famous, for the political combinations that ever centre around it.

A little further on, it is said that the whole distance by river from the Victoria Nyanza to the sea is about 3,500 miles. If the length of the Nile, so understood, is one-fifth of the distance from pole to pole, the whole distance must be five times 3,500 miles=17,500 miles; a measurement fit to disturb the minds of men and make Sir C. C. Scott-Moncrieff not less famous than the Nile.

Of several other strange statements in the lecture, the following, on a subject interesting to all men, deserves notice:

> I have already mentioned the cruel hardships of the corvée, the serf army of 85,000 men, who were employed in the canal clearances from January to July, nearly half the year. I believe this institution was as old as the Pharaohs, and it was not easy to abolish it. But of course it went sorely against our British grain. Little by little we got money to enable us to pay our labour. By an annual outlay of £400,-000 this spring corvée has entirely ceased since 1889, and now the Egyptian labourer carries out these clearances in as free a manner as his brother in Middlesex, and gets paid for his work.

On the 29th of March, 1891, the British Government published a similar statement in a letter from Sir C. C. Scott-Moncrieff, in these words:

> In 1884, the forced, unfed and unpaid labour of the peasantry amounted to 85,000 men working for 60 days. In 1890, perhaps for the first time in all history, there was no corvée in Egypt.

On the 26th of April, 1893, Mr. T. G. Bowles asked the Under Secretary of State for Foreign Affairs whether the system of forced labour, known as corvée, had subsisted during the ten years' English occupation of Egypt, and had not yet been abolished, and whether Her Majesty's Government proposed to take any measures for the abolition of this form of involuntary labour.

Sir E. Grey answered that it had so subsisted, and added:

> Her Majesty's Government do not propose to interfere.

In April, 1894, the Parliamentary Report on Egypt stated (p. 15):

> In Upper Egypt 32,720 men and 1,672 sheikhs were called out for an average of fifty days. In Lower Egypt 49,059 men and 3,164 sheikhs were called out for an average of eighty-two days.

The whole of these men were called out in the usual manner, Pharaonic, Ptolemaic and British, by means of the mudirs, or native governors.

It is an easy matter to calculate, from the figures given in the Blue Book for 1894, the amount of labour, forced, unfed and unpaid, extorted from the Egyptian peasantry by an institution sorely against the British grain.

The men called out in Upper Egypt were 34,392, whose work for 50 days represents..........	1,719,600 days.
The number for Lower Egypt was 52,223 men for 82 days, equal to..........................	4,282,286 "
Total......................	6,001,886 days.

Sir C. C. Scott-Moncrieff and the British Government do not seem to understand each other.

THE DEATH OF EMIN PASHA.—It was in October, 1892, that Emin Pasha arrived with a small force at Kinena, about 150 miles to the northeast of Kibonge, on the right bank of the Congo. At Kinena, Said ben Abedi, who accompanied him, proposed to go on to Kibonge, leaving Emin to take some rest with his men. This was done, and Emin busied himself for two or three weeks, according to the entries in his journal, in arranging his collections. The last entry bears the date of October 27, and it is supposed that he was killed the next day.

Mr. R. Dorsey Mohun, U. S. Agent in the Congo Free State, contributes to the *Century*, for February, an account of Emin's death, written down from the confession of his murderers. Mr. Mohun, while at Kassongo in April, 1894, was informed by his sergeant Omari that next day a caravan would arrive, and that in it were the two men who had killed Emin Pasha. The men, Ismailia and Mamba, Arab slaves, were arrested on arrival, and Mr. Mohun went with Omari to the guard-house to take their confessions.

They professed innocence, and Mr. Mohun sent Mamba to a separate room with Omari, instructing the latter to return in half an hour and report that Mamba had confessed that he and Ismailia had had a hand in the killing. Meanwhile Mr. Mohun questioned Ismailia, but to no result. Omari returned, as agreed upon, with Mamba's confession, and then Ismailia fell on his knees and begged for mercy, declaring it was true that he had helped to kill Emin, but that he only obeyed the orders of a big chief. Mamba was then brought back, and the story was told by Ismailia.

He and Mamba went with Said ben Abedi to the Chief Kibonge. Two days after they arrived, Mamba was sent back with a letter to Emin, and in the night Kibonge sent Ismailia with a letter to the Chief Kinena. After twelve days' journey Ismailia arrived, only ten minutes behind Mamba. The letter to Kinena was an order to kill Emin, and the two carriers were to give their assistance.

Emin was found sitting on the veranda of Kinena's house, writing at his table. The letter brought by Mamba was in front of him, and he was in good spirits at the thought of a start the next morning for Kibonge. Kinena came up with a few men who carried guns, and stood near the pasha, reading the letter which Ismailia had brought. When he had finished, he said to Emin: "Pasha, you leave to-morrow for a long march. Send your men into the plantations to get all the provisions you need, and you must not think of paying me for them. They are my present to you in return for the many things you have given to me and my women." Emin thanked him and had the men called by bugle. They were armed, and Kinena suggested that the arms should be left in the veranda, as the women in the plantations might be frightened by the sight of guns. After the men were gone, Kinena talked for a while with Emin and then made a sign to Mamba and Ismailia, who seized the pasha by the arms. He asked what they meant, and Kinena, looking at him, told him that he had to die. Emin answered: "What do you mean? Who are you that you can give orders for a man to die?" Kinena replied: "I do not give the orders. I receive them from my chief, Kibonge."

Three of Kinena's men came up and helped to hold Emin. He then said it was a mistake, and that he had a safe-conduct from Kibonge. Kinena then showed his letter, with the order for death. Emin read it, and said: "Well, you may kill me, but there are many who will avenge my death." He spoke of his child, two years of age, and asked that she should be sent to Said ben Abedi.

Kinena made a sign and the pasha was laid on his back, with a man at each arm and leg. Ismailia held his head, and the fatal stroke was given by Mamba. Emin's head was sent to Kibonge; his body was thrown into the bush.

Mr. Mohun took Ismailia and Mamba to Nyangwe. On the way Ismailia gave information that led to the arrest of another of Emin's murderers, a man named Ferrani, who broke down when confronted with Mamba and Ismailia and confessed his crime. The three were hanged in May, 1894, in company with the Arab chiefs who had massacred the Hodister expedition.

The little girl and her mother are at Kibonge, now a post of the Congo State, and the child will be cared for by the State.

Mr. Mohun does not believe that Said ben Abedi or Tipu Tip had anything to do with the death of Emin Pasha.

A LETTER FROM DR. DONALDSON SMITH, dated December 14, on the Shebeyli River, has been received by the Associated Press. He had penetrated five days' march beyond Sheikh-Husein, when he was met by a large armed force of Abyssinians, who had orders from the Emperor Menelik to stop the advance of the party. Dr. Smith tried to evade the order by seeming to comply with it for a short distance, and then resuming the original line of march; but in a few days he was confronted by the same force and ordered to return.

In his letter he reports a rich discovery made "down South." He had heard of a river that ran under a mountain where the god Waco had carved a palace for himself. He pushed in the direction of this mountain and discovered the most beautiful subterranean passage it would be possible to imagine:

> A large tributary of the River Juba had carved a way for itself under a mountain a mile in length. On both sides of the stream were great vaulted chambers from twenty-five to forty feet high and supported on massive columns. The columns were most superbly carved by the waters, and many of them, uniting, would form long arched passages. I have named these the Caves of Tyndlawn. I believe them to be the most remarkable caves of the kind in the world.

MT. RUWENZORI.—The London *Times*, of March 15, reports the substance of a lecture by Mr. G. F. Scott Elliot on his botanical exploration of Mt. Ruwenzori, and the country to the north of the Albert Edward Nyanza.

Mr. Elliot entered the region by the route from Mombasa to Uganda. The country northeast of the Victoria Lake he described as a rolling grassy plain, 6,000 feet above the sea-level and well adapted for colonization. He went west from the Victoria Nyanza to Mount Ruwenzori, which is said to have an altitude of 18,000 feet, and spent four months in exploring that district under the great disadvantage of a dense cloud hanging over the mountain the greater part of the day, which often prevented the party from seeing more than 50 feet ahead. The sides of the mountain were clothed at the base with a thick growth of trees resembling the laurel of the Canary Islands; above that bamboos to the 10,000 feet level; and above that again what the explorer could only liken to a Scotch peat moss, into which the traveller sank at every step a foot or more. Large trunks like those of *erica arborea* of the Canary Islands, but indicating trees 80 feet high, were noticed. Among other plants noticed were a viola, a cardamine, a gigantic lobelia, attaining a height of 5 feet or 6 feet, and a species of *hypericum* resembling that found in the Canaries; indeed, the similarity of the flora to that of the Canary Islands was remarkable. He ascended Ruwenzori to the height of 13,000 feet. Above 10,000 feet some of his porters could not sleep without suffering, and he climbed the other 3,000 feet with a reduced number of men. Evidences of animal life were found up to 7,000 feet, and among the animals were a species of water-buck, a new chameleon, a new snake and several new insects.

Mr. Elliot discovered that the Kagera River was navigable, and he thought that the route from the mouth of the Zambezi, by way of Lakes Nyasa and Tanganika to the Victoria Nyanza, would do more for international interests than a railway from Mombasa.

THE CONGO RAILWAY.—*Le Mouvement Géographique*, of March 5, publishes a letter of Father de Hert, of the Society of Jesus, describing a journey made by himself and five Sisters of Charity on the Congo Railway on the 23d of July, 1894.

He was surprised at the magnitude of the work and at the difficulties encountered and surmounted in laying the road-bed and in carrying it through ravines and hills and valleys.

He mentions particularly the cuttings in the Mpozo ravine, where the line is suspended on the side of the mountain, the bridge over the river, the numerous curves described in climbing the Palaballa and the viaduct across the ravine of La Chute sustained by piers 100 feet high, of solid masonry.

On Palaballa the travellers could see the road turning and returning on itself seven times.

It took fourteen hours to accomplish the journey from Matadi to the Monolith, a distance of 40 miles. The coal did not burn well, the train ran off the track in one place, and in another there was a collision with a freight car; but nobody was hurt.

The editor of the *Mouvement Géographique* remarks, truly enough, that the caravans required three days to make these 40 miles and that, before long, the fourteen hours will be reduced to three or four; and he presents, in a Supplement, a map showing on a scale of 1:250,000 the first 175 kilometres (109 miles) of the road, from Matadi to Kimpesse.

THE VON GÖTZEN EXPEDITION.—Additional details concerning this expedition (BULLETIN NO. 4, 1894, pp. 557–560) are published in the *Mouvement Géographique*, of February 17, as given by Count von Götzen.

The country of Ruanda is well populated by a fine race of Galla origin. It was formerly rich in herds of cattle, remarkable for their immense horns, but most of them were carried off by a plague a few years ago. The title of the Chief of Ruanda is *Kigeri*. He possesses a dozen residences which he occupies in succession. The explorers met him on the upper Kagera River, again on the extreme frontier of the Congo State, and once more not far from the Kivu Lake. He treated them always with hospitality. The Arabs have frequently tried to establish themselves in Ruanda but without success, and in all this region, including Karagwe, they were not seen by the expedition, except at Kafuro, where three or four Tabora traders are settled.

Lake Kivu lies almost midway between Tanganika and Albert Edward, and wholly within the Congo State. It is nearly oval in form, with its greater extension from north to south, and it is shut in on the east and the west by the cliffs of the great *fault*, which encloses also the Albert Edward and the Tanganika. In the southern part of the lake is the large Island of Kuisui, almost equally divided by the parallel of 2° S. Lat.

On the 27th of June, 1894, the expedition climbed the steep slopes of the rocky crest, which divides the streams of the Tanganika basin from those of the Congo, and constitutes the mountain knot that marks the limit of the basin of the ancient interior sea. Three months were spent in the march through this unknown country of the Kivu Lake. The first part of the journey was through a mountainous region, sometimes at an elevation of nearly 9,000 feet, and for four days the men suffered with the cold, the mercury going down at night to 37 degrees. They passed through forests of gigantic bamboos, but the land was thinly peopled by the Buttenbo. The forest limit was attained in E. Long. 28° 10′.

The vegetation was not so dense as in the part described by Stanley and the foliage was nowhere thick enough to shut out the rays of the sun, while picturesque glades diversified the landscape. The inhabitants are called Bulegga. The first important village was Mkashi, with a population of 5,000, under a negro chief named Kawareware, who spoke Arabic. He was astounded at the sight of white men arriving from the East, and eagerly welcomed them with assurances of his complete submission. He told them that the Msenge (Belgians) were hunting down the Arab chiefs.

Mkashi is in the forest on a southern affluent of the Lova River. This, at the point where it was crossed, was already a considerable stream, 1,500 or 1,600 feet in width. It flows from the east and descends from the plateaux by a succession of rapids. Farther down, it receives two affluents from the northeast, the Oso and the Luvuto.

In the latter part of the march the expedition fell short of provisions, but it was relieved by a party under Lieut. Simons, sent forward from Kirundu to meet the white men reported as on their way from the East.

From Kirundu, the descent of the Congo was a kind of triumphal procession till the Germans embarked on the Portuguese mail steamer on the 19th of December.

Count von Götzen's crossing of Africa is, according to the *Mouvement Géographique*, the quickest of the thirteen so far accomplished. It was made in 11 months and 8 days.

ESCAPE OF SLATIN BEY.—Slatin Bey, who was captured with his force of 700 men by the Mahdi, in 1883, and has ever since been a prisoner in the Sudan, escaped from Omdurman on the 20th of February and reached Cairo on the 19th of March.

Details of the arrangements for the rescue of Slatin are kept back, out of consideration for the Europeans still in the hands of the Khalifa.

Two Arab guides, with their camels, were in readiness outside of Omdurman on the evening of February 20. Slatin joined them, and the flight began. In 21 hours the fugitives made 120 miles, in a straight line from the starting point, but actually much more, for they had kept under the lee of a range of hills to avoid discovery. They were pursued and twice, while they lay hidden, saw their enemies pass by to the northward. They left the direct route, for greater safety, and turned to the north-east. Once they halted for five days in the desert.

On the twenty-fourth day Slatin reached Assuan, where he was beyond reach.

Rudolph Slatin is an Austrian, 38 years of age, and half his life has been spent in the East. In 1882 he was Governor of Darfur, the province first affected by the Mahdi revolt, and his heroic valour in fighting the insurgents made him famous throughout the Sudan. He was treated with alternate kindness and cruelty by his captors.

He reports that the power of the Khalifa is waning, but that the military organization is unbroken and can only be crushed by a strong force. The position and movements of the Italians cause great anxiety at Omdurman.

Notwithstanding all he has endured, Slatin is full of vigour and energy and in apparently perfect health.

SCIENTIST.—There has lately been discussion in England concerning the unlucky word, *scientist.* Prof. Huxley, in his haste, puts it on a level with *electrocution.* Sir John Lubbock also condemns the word and would replace it by *philosopher.* Lord Kelvin and Lord Rayleigh prefer *naturalist*, in its wider sense; and Dr. Albert Günther suggests that *scientist* be reserved to denote the dabbler in great scientific questions. *Nature*, of January 10 (p. 253), solemnly records its protest against the offender:

> The word is never allowed knowingly to appear in contributions to NATURE.

Mr. Grant Allen does not defend *scientist*, but he considers with reason that, as languages grow irresponsibly, it is pedantry to object to a new word when it is used by a majority of persons. Mr. Alfred Russell Wallace holds that the word is useful, and that the objection to it comes too late in the day.

This is a sensible conclusion. The word will keep its place in the language, outside of *Nature*, and it must grieve every one to think that Dr. Günther himself may live to be known as a scientist.

WASHINGTON LETTER.

WASHINGTON, MARCH 25, 1895.

SMITHSONIAN INSTITUTION.—The XXXVth volume of the Smithsonian Miscellaneous Collections will contain the Smithsonian Meteorological, Geographical, and Physical Tables. These tables are intended to replace in modernized form and with newer knowledge the Guyot Meteorological and Physical Tables first published in 1852, and which has since been a standard work of reference for investigators. The first part of the volume, the Meteorological Tables, was published last year. The Geographical Tables prepared by R. S. Woodward, formerly of the Coast Survey but now of Columbia College, have recently been published. The introductory part (about half the volume) is divided into seven sections under the heads, Useful Formulas, Mensuration, Units, Geodesy, Astronomy, Theory of Errors, and Explanation of Source and Use of Tables. The Physical Tables are now being prepared by Prof. Thomas Gray.

The explorations of the Smithsonian Institution during 1894 were carried on chiefly through the Bureau of Ethnology and the National Museum. The most extended of these were in New Mexico and Arizona. Another party spent several months in the Indian Territory and Oklahoma. Other collaborators visited northern Wisconsin and northeastern Minnesota. In the eastern United States archæologic investigations were continued in New Jersey, Pennsylvania, Maryland, Virginia, central Ohio and Tennessee. These are regarded as of special interest, and results will in due time be made public. Explorations and studies were made also in Kashmir, India, the Seychelles and adjacent islands by Dr. William L. Abbott; by Professor Cook in Liberia; by Consul-General Crawford in Finland.

A volume of Contributions to Knowledge is now passing through the press, the subject being Oceanic Ichthyology, by Dr. G. Brown Goode and Dr. Tarleton H. Bean. It is an exhaustive dissertation on the fishes of the ocean depths and particularly those of the North Atlantic Basin.

Prof. Langley says that he had hoped to complete the publication of the photographic volume on the moon; but the science of photography has not yet progressed sufficiently to meet the requirements of the work.

In spite of the persistent effort to reach all who might be interested or who might wish to contribute to the competition for the Hodgkins $10,000 prize and minor premiums, for treatises on the nature and properties of atmospheric air in connection with the welfare of man, it was found that in so wide a distribution the circulars had in various instances failed to reach those for whom they were intended. This fact led to the extension of the time for competition from July 1 to December 31, 1894. Up to June 30, 1894, 259 memoirs, printed and manuscript, had been received, representing correspondents in the United States, Mexico, England, Scotland, Norway, Denmark, Russia, France, Belgium, Germany, Austria-Hungary, Servia, Italy, and British India.

The Institution has recently published Giuseppe Sergi's treatise entitled "The varieties of the human species. Principles and method of classification." Dr. Sergi is professor of anthropology in the Royal University of Rome, and has made numerous and valuable contributions to this literature.

CONSOLIDATION OF GOVERNMENT SURVEYS.—The project of consolidating the government surveys, that is to say, the Geologic Survey, the Coast and Geodetic Survey, the Land Office Surveys, and the Hydrographic Office Surveys, failed to get the approval of the Congress just closed. The Joint Commission to inquire into the status of laws organizing the executive departments advocated the consolidation of these into two surveys; recommending that the Geological Survey, the land work of the Coast and Geodetic Survey, and the surveying done under contracts from the General Land Office be organized under one head, and the hydrographic work of the Coast and Geodetic Survey and of the Hydrographic office of the Navy Department under the other, abolishing at the same time the office of Surveyor-General in the various public land States.

TOPOGRAPHIC MAPS.—A proposition to distribute the topographic map of the United States to public schools corresponding in grade to the grammar, normal and high school, academies, colleges and universities failed to receive the approval of Congress; but provision was made for the general sale of the sheets, or of any separate sheet, at the cost of publication.

BOUNDARIES.—Congress at its last session passed a joint resolution relating to the British Guiana-Venezuela boundary dispute, declaring that the President's suggestion made in his last annual message that Great Britain and Venezuela should refer their dispute to friendly arbitration, be earnestly recommended to the favorable consideration of both parties.

This dispute has grown out of an indefinite description of boundary lines in the treaty which effected the purchase of Guiana from Holland by Great Britain in 1814. Geographers and travellers invariably asserted that the Essequibo River, a natural boundary, was the dividing line; but this line had never been formally mentioned, and the omission has been a source of trouble ever since Venezuela became an independent republic in 1836. Fifty years ago an English commissioner set boundary posts at the mouth of the Orinoco, far to the westward of the Essequibo, but these were subsequently withdrawn, and steps taken towards settling the question by treaty. The matter has been procrastinated and postponed from that time to the present, Great Britain in the meantime maintaining a firm hold on the disputed territory.

The dispute between Argentina and Brazil for the fertile territory lying between the rivers Uruguay and Yguazú, which goes by the name of Misiones, has been decided in favor of Brazil by the President of the United States, who was selected as arbiter by the two claiming Republics. This dispute had been maintained for a century and a half between Spain and Portugal, and between Argentina and Brazil as heirs of their mother countries. The territory involved covers an area of about 31,000 square miles. The early Jesuit fathers planted their missions in this interfluvial territory of great natural advantages of climate and soil whose lines had never been properly fixed, and hence became and continued to be the object of longing desire by both countries. The President has decided that the boundary line is constituted and shall be established by and upon the rivers Pepiri (also called Pepiri-guazú) and San Antonio, to wit, the rivers which Brazil has designated.

ALASKA.—It is stated that about 1,000 white people have been added to the population of Alaska since the census of 1890. Most of these are settled at Juneau and the mining camps in that vicinity. The mining industries are reported to be in a prosperous condition, and considerable capital is being invested in those lines. But the isolated condition of the region and lack of representation in Congress render it impracticable to gather much information as to the actual condition of the Territory. It has received but small attention from Congress since the passage of the act organizing a district government in 1884. Propositions looking towards representation in the national legislature, to provide a code of laws, to provide a civil government, and to provide for the formation and government of municipal corporations have engaged the attention of Congress to the extent of favorable reports from the committee having such matters in charge, but no action has yet been taken to give effect to these recommendations. The Governor of the Territory is of the opinion that the Indian population is decreasing, especially on that part of the coast where they come in contact with white people, and also on the western coast, from a want of proper food supply. The experiment of shipping domesticated reindeer from Siberia and propagating them is reported to be successful. A considerable portion of the expense of this undertaking has been defrayed by private contributions. Congress has steadily reduced appropriations for education since 1891.

There has been no legislation by Congress extending the public land laws generally over Alaska, but an act approved March 3, 1891, entitled "An Act to repeal timber-culture laws and for other purposes," makes provision, under certain conditions, for the disposal of public lands in the Territory of Alaska for town-site purposes, and for the use and necessities of trade and manufacture. An evidence of some activity in this direction is shown in the fact that eighty-six applications for surveys have been received at the General Land Office, including town sites (2), fishing stations, trading posts, canneries, saw mills, coal shipping, etc.

PACIFIC OCEAN SUB-MARINE CABLE.—An appropriation of $500,000 towards the construction of a sub-marine cable to the Hawaiian Islands was defeated during the last hours of Congress.

The Government of Hawaii, which preceded the present Republic, made an effort to lease to Great Britain one of the uninhabited islands belonging to Hawaii as a station for a sub-marine cable, to be laid from Canada to Australia, with a connection between the island leased and Honolulu. This project would have been completed but for a clause in our reciprocity treaty with Hawaii, which provided that as long as said treaty remained in force the government of Hawaii would not "lease or otherwise dispose of or create any lien upon any port, harbor, or other territory in its dominion, or grant any special privilege or right of use therein to any other power, state, or government."

It became therefore necessary to secure the consent of Congress before the proposed lease could be effected; and the President of the United States in a message to the Senate and House of Representatives, dated January 7, 1895, recommended a modification of the treaty so as to permit the proposed lease; remarking that he hoped Congress would see fit to grant the request, and that our consent to the proposed lease would be promptly accorded.

Congress took no action on the message.

SAMOA.—The Commission, composed of W. L. Chambers for the United States, B. M. Haggard for Great Britain and T. Greiner for Germany, appointed under the Treaty of Berlin to settle questions affecting the titles to lands in Samoa, has completed its work. The detailed statement of results is in Samoa. The United States Commissioner has submitted his individual report to the Secretary of State. It is stated that the general policy of the Commission was to favor the natives, although it has been reported in German newspapers that the result was to give to the Germans nearly all the lands on the islands. There were titles to land held by natives, German traders, Englishmen and Americans, that in the aggregate amounted to 200,000 acres more than the whole area of the islands.

NOTES.—The Bureau of American Republics is reliably informed that the Guatemalan government is taking steps to re-establish the old port of Istapa, situated about six and a half miles from San José. It is proposed to construct a harbor there capable of accommodating one hundred vessels. This action has been rendered necessary because the port of San José is no longer sufficiently large to handle the incoming and outgoing traffic of the Pacific coast of that republic. It is proposed to build a branch railway from some point on the Central Railway to connect with this new port.

The Bureau has recently issued a Hand-book of Honduras and the second volume of the Code of Commercial Nomenclature.

The several scientific societies of Washington, in conjunction with representatives from the Smithsonian Institution, the National Museum, the Geological Survey, the Army Medical Museum, have organized as a federation. The federated Society is composed of the officers and administrative boards of the several components, and has power to provide for joint meetings and to conduct courses of popular lectures, to act in the interest of the component societies at the instance of any of them, etc. The societies represented in the federation are the Anthropological, the Biological, the Chemical, the Entomological, the Geologic, the Philosophical, and the National Geographic. At the last meeting of the federation action was taken in regard to inviting the International Geographical Congress to hold its next session in Washington. The Congress has never held a session in this country.

OBITUARIES.

WILLIAM REMSEN.

Mr. William Remsen, for many years the Chairman of the Council of the American Geographical Society, died in New York City, on the 3d of March, 1895, in the 81st year of his age.

He was a highly-esteemed citizen and was a direct descendant of Rem-Jansen, one of the earliest of the Dutch settlers in the vicinity of NewYork; the name was contracted in the early days of the country into Remsen. Mr. Remsen was a typical representative of those upright, frugal, unostentatious and intelligent Knickerbockers who by their business sagacity, their probity and consistent lives formed so valuable a part of the population of this metropolis. Mr. Remsen was born in this city in 1815. His father, Henry Remsen, was one of the presidents of the Manhattan Bank. He received a classical education and was graduated at Princeton College in 1835. He afterward studied law under Judge William Kent, son of Chancellor Kent, but never practised his profession, having inherited an estate which required his personal supervision, and which was largely augmented under his careful management. He married Jane Suydam, a representative of another old Dutch family of this city, of which marriage five children survive. Mrs. Remsen died a few years ago. Mr. Remsen was one of the founders of the Third Avenue surface railroad and one of its largest stockholders. He was for thirty-four years a trustee of the Greenwich Savings Bank, and for eighteen years its vice-president, and also for about the same period he was a trustee of the Northern Dispensary, at the junction of Waverley Place and Christopher Street. He was one of the oldest living members of the American Geographical Society, and for many years the chairman of its council. He was an old member of the Historical Society.

SIR HENRY RAWLINSON.

Sir Henry Creswicke Rawlinson died in London on the 5th of March, 1895, at the age of eighty-five years. He was born in Oxford, and entered the East India Company's service in 1827. He devoted himself to his military duties, as well as to the study of

Oriental languages, and was one of the officers sent in 1833 by the Governor-General to re-organize the Persian army. In Persia, where he remained for six years, he travelled extensively and paid great attention to the archæological remains and especially to the Behistun inscriptions. When the Afghan difficulties began, he was sent to Kabul, and later to Kandahar, where he prepared for the coming struggle by collecting supplies and expelling the Afghan population. He successfully defended the city against the victorious enemy, and returned to India with increased reputation.

He was appointed British Resident at Bagdad, in 1843, and there continued his study of the cuneiform inscriptions, to which he found the key. The writings at Behistun are on the smooth face of the rock, at an elevation of 300 feet above the plain, and it was a task of extreme difficulty and danger to reach them, but Sir Henry succeeded in copying the entire record.

In 1856 he was appointed a Director of the East India Company, and the next year took his seat in Parliament for Reigate. He was sent as Minister to Persia in 1859, and after his return to England again entered Parliament as Member for Frome. In 1868 he was made a Life Member of the India Council. Besides his well-known work, *England and Russia in the East*, Sir Henry's literary productions were confined to the memoirs which he contributed to the learned societies of Europe.

ISMAÏL PASHA.

The ex-Khedive of Egypt died on the 2d of March, 1895, at his palace on the Bosporus, where he had lived in virtual captivity for a number of years.

Ismaïl was the son of Ibrahim Pasha and was educated in Paris. He became Viceroy of Egypt in January, 1863, and for fifteen years gave a loose rein to his extravagant taste for display and self-indulgence, without wholly neglecting his duties as a ruler. He built railways, made ports at Alexandria, Port Saïd and Suez, opened the Suez Canal, and extended his dominion to the equator; but the vast wealth which came into his hands, through the rise in the price of cotton caused by the American Civil War and from the numerous Egyptian loans, was squandered for the most part in reckless prodigality.

His forced abdication on the 26th of June, 1879, closed a career in which charity itself can find but little to approve.

BOOK NOTICES.

Les Abîmes, les Eaux Souterraines, les Cavernes, les Sources, la Spélæologie. Explorations Souterraines effectuées de 1888 à 1893 en France, Belgique, Autriche et Grèce, avec le concours de M.M. G. Gaupillat, N.-A. Sidéridès, W. Putick, E. Rupin, Ph. Lalande, R. Pons, L. De Launay, F. Mazauric, P. Arnal, J. Bourguet, etc. 4 Phototypies et 16 plans hors texte. 100 Gravures d'après des Photographies, et des Dessins de G. Vuillier, L. de Launay, et E. Rupin (9 hors texte) et 200 Cartes, Plans et Coupes. Par E.-A. Martel. 4to, pp. viii–580. Librairie Ch. Delagrave, Paris, 1894.

In the preface to this superb volume M. Martel recalls the impression produced upon him in early youth by the sight of the grotto of Gargas and the subterranean torrent of Eaux-Chaudes, in the Pyrenees. Thirteen years later, when visiting the cave of Adelsberg, in Carniola, he could not but envy those who first entered those vast and dazzling vaulted chambers.

In 1883–1885 he explored in every direction the country of the *Causses*, with its cañons and underground rivers,* and he has since extended his travels into Belgium, the Karst, and the Peloponnesus. Beginning as a tourist in search of the picturesque, M. Martel was soon led to see the opportunity offered by these journeys for the solution of many obscure problems. He visited in France alone, from 1888 to 1893, 230 abysses, sources and grottoes, small and large, and made subterranean plans, amounting in all to a length of 50 kilometres (31 miles), three-fourths of it in localities previously unknown.

For the science, to which he has devoted himself, M. Martel adopts the name of *spelæology*, first proposed by M. Emile Rivière. This new branch of science presents a number of subdivisions, hydrological, geological, topographical, agricultural, hygienic and meteorological, while the flora and the fauna and the pre-historic remains of these cavities are eminently worthy of special and systematic study. In some of these subdivisions there has been considerable activity in Austria during the past twelve years, and M. Martel looks for results even greater than those already obtained, when explorers shall have adopted the two inappreciable instruments, which have done him such service: the telephone and the folding canvas boat.

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* Fully described in his book, *Les Cévennes et la Région des Causses*, published in 1890.

The boat recommended by M. Martel is that made by Osgood, of Battle Creek, Michigan. This weighs, according to size, from 20 to 40 kilogrammes (45–90 lbs.), and carries from one to four persons. The size, No. 2, can be transported in four pieces, weighing each from 15 to 20 lbs. The only defect of the Osgood is its slightness, which makes it liable to damage; but it has very great elasticity.

There is danger in the exploration of the caverns. Sometimes the agitation of the air caused by a slight noise loosens a stalagmite, supported on a narrow base, and brings it rolling down a slope; or a mass of carbonate of lime, apparently solid, gives way under the hand or the foot, on the edge of an opening. When afloat on the underground stream, it is necessary to be alive to every sound that may indicate a cascade near at hand, and to take the alarm if the candles begin to burn dimly, a sure sign of the presence of carbonic acid. M. Martel met with this poisonous gas only four times in France, but it is always to be feared, and the candle, which detects it, is to be preferred to the electric light.

Another danger is that of venturing too far in the boat under the low roof of the cavern, and finding the return cut off by the rise of the stream from the effect of heavy rains.

With prudence and experience these and the many other perils of navigation and discovery below the surface of the earth may be avoided or overcome, and the rewards of adventure in this field, as set forth in this book, offer a positively new sensation.

M. Martel has not contented himself with showing what has been done to reveal the wonders of the under-world; he has succeeded in forming the first Spelæological Society. Mr. Mark Stirrup writes as follows to *Nature*, of March 14:

> The formation of the Society, M. Martel writes me, is now an accomplished fact. About 130 gentlemen of all nationalities, some of whom bear well-known names in the ranks of science, have signified their adhesion. A provisional code of rules has been printed and adopted, and a meeting has already taken place, under the presidency of the president-elect, M. F. Deloncle, Deputy for the Basses-Alpes.
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> The first article of the rules states the object of the Society as follows: "The Society of Spelæology is instituted in order to insure the exploration—to facilitate the general study—to co-operate in the regulation or utilisation—of subterranean cavities of all sorts, known or unknown, whether natural or artificial; to encourage and aid with funds investigations relating thereto; in a word to popularise and develop in a way, at once practical and theoretical, utilitarian and scientific, researches of all kinds in the interior of the earth." The subscription for ordinary members is fifteen francs per annum. It is intended to publish a quarterly bulletin; to a copy of which each member will be entitled.

Mr. Stirrup adds that M. Martel, the Secretary, may be addressed at 8 rue Ménars, Paris.

The Voyages of the Cabots in 1497 and 1498. With an attempt to determine their landfall and to identify their island of St. John. By Samuel Edward Dawson, Lit.D. From the Transactions of the Royal Society of Canada, Vol. XII, Section II, 1894, pp. 51–112.

Dr. Dawson has written an admirable paper. At the outset, he accepts without discussion the following propositions:

That John Cabot was a Venetian, who settled in England with all his family;

That Sebastian, his second son, was born in Venice;

That letters patent of Henry VII were issued March 5, 1496, to the father and his three sons, empowering them, at their own expense, to discover and take possession of new lands for England;

That John Cabot, accompanied perhaps by Sebastian, sailed from Bristol in May, 1497, discovered and landed upon some part of America, between Cape Cod, in Massachusetts, and Cape Chidley, in Labrador, and returned to Bristol in July of the same year;

That in consideration of this discovery King Henry VII granted solely to John Cabot new letters patent, dated February 3, 1498, authorizing a second expedition on a more extended scale. That this expedition consisted of several ships and about 300 men; that it sailed in the spring of 1498, and that John and Sebastian Cabot went with it. It returned, but no one knows when, and with it John Cabot disappears from history.

The two voyages are to be distinguished. The former, accomplished by John Cabot, in the little ship *Matthew*, with a crew of 18 men, lasted over three months, for which period only it was provisioned, and its course was south of Ireland, then for a while north and lastly west, with the pole star on the right hand. On this first voyage no ice was reported and no man was seen.

The second voyage was in every respect unlike the first, and the question of the first landfall has been complicated by confounding the incidents and events of the two expeditions.

From his critical examination of the authorities, corrected by his personal acquaintance with the coasts and the waters, Dr. Dawson draws these conclusions:

1. That the island called St. John on the map of 1544 is not that now known as Prince Edward Island, but is the great Magdalen Island, which lies in the course of vessels passing through the strait between Cape Breton and Newfoundland.

2. That the island of St. John of Cabot is Scatari Island, marking the landfall at Cape Breton, the easternmost point of the island called after it, and that that cape is the natural landfall of a vessel missing Cape Race and pursuing a westerly course.

It follows, in his opinion, that John Cabot planted the banner of St. George on the American continent on the 24th of June, 1497, more than a year before Columbus set foot on the mainland. To speak with exactness, however, the priority can hardly belong to Cabot, since Cape Breton is, after all, an island.

It is less easy to settle the claims of Sebastian Cabot. Mr. Henry Stevens's formula—Sebastian Cabot — John Cabot=zero—has the sting and the honey and the girth of the epigram, but it is not to be taken seriously. Sebastian was a self-seeker, dishonest and false-hearted, according to some writers; but Dr. Dawson judges him with charity. He says that Cabot's reputation has been entirely at the mercy of his friends and that it is impossible to say whether he was addicted to inaccuracy of expression, or his friends were endowed with treacherous memories. His ability and nautical knowledge are hardly to be questioned. For years he held the office of Grand Pilot of Spain and, as Dr. Dawson says, Ferdinand and Charles V, who were good judges of men, trusted him to the last.

Dr. Dawson finds some firm ground in the conflicting testimony with regard to the second expedition, which returned under command of Sebastian. These points are established: That the expedition was a large and important one; that it sailed to the north, and that the landfall was far in the north in a region of ice and continual daylight; that from the extreme north it coasted south to latitude 38° in search of an open ocean to Cathay; that having been provisioned for a year, the expedition was fitted for such an exploration, and had the time to perform it.

If, as seems probable, the landfall in this case was on the coast of Labrador, the honour of discovering the mainland of North America belongs to the second expedition, rather than to the first; but nothing can be affirmed on this point, and the distinction, such as it is, of the first landing on the continent seems to belong of right to Columbus.

The First Landfall of Columbus, by Jacques W. Redway, F.R.G.S. Reprint from National Geographic Magazine, 1894, pp. 179–192.

In this paper Mr. Redway makes a well-sustained effort to identify the island of Samaná with the Admiral's Guanahani. He finds by a study of the earlier maps that Guanahani, El Terrigo, Trianga, Atwood Cay, Isle Nova and Samaná are one and the same, and that one is the Guanahani of Columbus. He admits at the same time that, in the maps of the sixteenth century,

> the transference and reduplication of names was made in a wholesale manner,

and he claims only to have furnished additional evidence in favour of Samaná.

It may well be doubted whether Guanahani can ever be identified in such a manner as to make an end of controversy on the subject; but meanwhile the style and manner of Mr. Redway's argument are to be commended.

Four reproductions of charts elucidate the text.

À Travers l'Afrique Australe, par Jules Leclercq, Membre Collaborateur de la Société Impériale Russe de Géographie, etc. Ouvrage accompagné de gravures et d'une Carte. Pp. 313, 18mo. (*Librairie Plon.*) *Paris, 1895.*

M. Leclercq is an unwearied traveller, and he tells his experiences, whether of Colorado, or Samarcand, or South Africa, in the same agreeable style.

He arrived at Cape Town in June, in the rainy season, which is the South African form of winter. The city seemed to him altogether ugly and unworthy of its situation, but he was greatly impressed by the Municipal Gardens, the Library and the Museum.

He devotes a chapter to the government of the colony, and another to Sir Henry Loch and Mr. Cecil Rhodes, whom he admires. From Cape Town he crossed the Karroo to Kimberley and the diamond mines. Here he was able to study the life of the workmen. One company employed 8,000 men: 1,400 whites, 6,000 blacks, and several hundred convicts, of various races. In one *compound* M. Leclercq saw 2,000 Caffres, who were locked up every night, when their twelve working hours were past, to be marched out in files in the morning. They are regularly searched after the day's labour; yet they manage to secrete a certain proportion of the stones. These men are paid for their work, and this is the one distinction between their lot and that of the slaves in the Brazilian mines.

M. Leclercq visited also the Orange Free State, the Transvaal, Zululand and Natal. He foresees that the English capital will ultimately carry the day against the independent spirit of the Boers, in spite of their victories in the field; and in describing these he makes a criticism of Mr. Gladstone, which will hardly take its place in history.

He was delighted with Natal, the paradise of Africa, where the Hindus are establishing themselves, and in Zululand he could not sufficiently admire the native race. He expresses the opinion that the future of all South Africa belongs to the natives, Caffres or Zulus:

> . . . . Ai posteri
> L'ardua sentenza . . . .

Diary of a Journey though Mongolia and Tibet in 1891 and 1892. By William Woodville Rockhill, Gold Medalist of the Royal Geographical Society. Published by the Smithsonian Institution. 8vo, pp. xx–413. *Washington, 1894.*

Mr. Rockhill's journey was undertaken partly under the auspices of the Smithsonian Institution. In an Introductory Notice the author briefly describes the previous journeys in Tibet from the time of Friar Odoric, in 1325, down to the year 1891. Some of the most valuable work has been done by the native explorers trained for scientific geographical work, and sent into the countries beyond the Himalaya by the Great Trigonometrical Survey of India. They have traversed the whole of Tibet from south to north and from west to east, and have surveyed the important towns and the country of Central and Western Tibet. One of them, known as A—— K——, has made a map of the city of Lh'asa on a scale of four inches to the mile. Excellent as surveyors, these explorers are not well-trained observers, and details of value escape their attention.

It was after his journey in 1888–1889 that Mr. Rockhill determined to visit Mongolia and Tibet once again and, if possible, to reach Nepal or Sikkim by crossing Tibet from north-east to south-west. He endeavoured to steer clear of Lh'asa, but was diverted from his intended path, when at very nearly the same spot at which Bonvalot and Bower had been stopped, and was forced by the Tibetans to turn his face eastward. The remainder of his journey was through a not unknown country, but he believes that he has been able to collect information which will be of value to future explorers.

The sketch route-map accompanying the volume is from an original on a scale of four statute miles to the inch.

Wherever Mr. Rockhill has been able to check his observations by those of others—the Jesuits in the 17th Century, Prjevalsky and Bower—he has found a fair agreement in the results, though he regards his own work as nothing more than a rough preliminary sketch of a nearly unknown region. During the whole length of his journey of 3,400 miles, Mr. Rockhill took observations for time and latitude, and for altitude, by the boiling point of water and from aneroid readings, besides meteorological observations, taken three times daily, for temperature, pressure, cloudiness, wind, etc.

The diary form of the narrative, adopted by the author after much hesitation, vindicates his choice by conveying in a lively way the impression of the moment, and enabling the reader to estimate the hardships of fatigue and dirt and bad smells, through which the traveller forced his way for months. The party were nearly starved when, early in July, 1892, they reached the neighbourhood of the Tengri Nor and were refused permission to go any farther. Some days were spent in parleying, and meanwhile all good things to eat were pressed upon them. The return was through China to Shanghai.

Mr. Rockhill's knowledge of the Chinese and Tibetan languages gives a special value to his notes and comments.

Besides the map, the volume has numerous illustrations from drawings and photographs.

Corea or Cho-sen, The Land of the Morning Calm. By A. Henry Savage-Landor. With numerous Text and Full-Page Illustrations from Drawings made by the Author. 8vo, pp. xiii–304. (*Macmillan & Co.*) *New York, 1895.*

Mr. Savage-Landor spent several months in Corea, or rather in the capital, Seul, and embraced every opportunity of studying the natives, their manners and customs, as they appeared to a foreigner, unacquainted with the language or the history of the country.

His story is straightforward, and his descriptions impress the reader by their evident truthfulness. There is something too much of the difficulties the author encountered in the way of his morning dip, and his puns could be spared, but he keeps a hold on his subject to the end.

These pen and pencil sketches from the daily life of a strange and a decaying people have the value of what are called human documents, for all students of the Hermit Nation, and of Eastern Asia.

The Eastern Bimetallic League (established 1894). The appreciation of Gold; Notes illustrative of the disastrous effect upon foreign commercial interests in the Far East, and upon the Industries and Wage-earners of the West, by H. Kopsch, F.R.G.S., Member of the Eastern Bimetallic League. 12mo, pp. vi–18. Shanghai, 1894.

This pamphlet of 18 pages is a sermon on the following text:

"As the children of the house of Israel do worship gold, even so shall gold be their damnation."

Mr. Kopsch brings together a number of facts to show that the competition of Asia threatens to make the lot of the Western labourers harder than that of the slaves in former days, and that unless silver is remonetised, protective measures will have to be adopted to exclude Oriental manufactures from the gold-using countries. The prospect is gloomy, but there seems to be a difference of opinion on the subject, even in Shanghai.

Definitions of Geographical Names, with Instructions for their correct pronunciation. For teachers and pupils of the various grades of schools of the United States. A supplement to every School Geography. By Dr. Konrad Ganzenmüller. 8vo, 32 pp. *Kurt Moebius, New York, 1894.*

Dr. Ganzenmüller's pamphlet answers a number of the questions for which the scholar consults the *Nomina Geographica.*

It is, perhaps, a mistake to suppose that pupils will take an abiding interest in the meaning of names of places; but it is a service done to show that the names have a meaning, which may be arrived at with a little effort.

Primary Geography. By Alex. Everett Frye. 4to, pp. viii–137. Ginn & Co., Boston, 1894.

Mr. Frye has no misgivings about the character of his work. He says, in his preface:

> "*The subject is treated topically.* The day of patchwork teaching has passed. Teachers have long been asking for a text-book based on the topical study of the earth. This book holds the *earth as a unit* before the mind, and relates all study to that unit. The memory is thus aided and much time is saved.
>
> *The text on* PEOPLE *centers in child-life.* The word *race* has a deeper meaning than is taught by the size of cheek bones or the texture of hair. This book leads pupils into the *homes of the races.* Read to a child one of the stories on pages 55 to 72, and note the result."

The taste displayed in these paragraphs is not to be commended. Acquisition of facts is not the one good thing for children, and a tone of aggressive self-confidence in a teacher sets a bad example.

The book is a good one. It is well arranged, and the information is given in a direct and interesting way. The map is used from the beginning, and the questions asked rise naturally out of the text, while the illustrations, which are numerous, are for the most part accurate and helpful.

MAP NOTICES.

Rain and Snow of the United States, compiled to the end of 1891, with seasonal, monthly and other charts. By Mark W. Harrington, chief of the Weather Bureau, Washington, 1894.

The U. S Weather Bureau published, last October, as Bulletin C, an atlas containing maps showing the mean precipitation for each month, each season and for the year, and following it, a bulletin containing the data upon which the maps are based. In this is given the precipitation in each year of record at 1,073 stations, being by far the most complete compilation of the kind ever made in this country. It contains, also, the mean monthly rainfall at 103 stations, besides much other valuable data.

The execution of the maps is not in keeping with the value of the data which they present.

In preparing a precipitation map, as in preparing any other map, one has measurements at certain points, which serve as guides in sketching lines. In this case the data consist of rainfall measurements at a few hundred points scattered over the country. At these points, each the size of a rain gauge, we may say we have data, though it is, at best, rather uncertain data.

The rainfall at any station ranges widely from year to year, so much so that an average of less than ten years is likely to be misleading. The rainfall is so greatly affected by local topography, and even by the situation of the gauge, that the result from a single station may differ widely from those of neighbouring stations. On these accounts, it is advisable, wherever possible, to use the mean rainfall of several years at each station, and to use the mean of several neighbouring stations, instead of using the data from stations individually.

The rainfall over the areas between these points of observation is related to that at these observed points, in accordance with known laws, dependent upon the relief of the country, the source of the moisture and the direction of winds. A knowledge of the laws of rainfall, the relief of the country and its influence upon rainfall, are therefore absolutely necessary in preparing rainfall maps.

In the maps before us it would seem that sufficient consideration has not been given to these important points. Although, on the score above suggested, these maps are not all that could be desired, they give a much better idea of the distribution of rainfall than any heretofore published. The gradual diminution of the annual rainfall inland from the Atlantic and northward from the Gulf, the two main sources of moisture; its diminution westward, on the slope of the Great Plains; and eastward from the Pacific Coast, are clearly shown.

The maps showing monthly and seasonal rainfall develop the peculiarities of distribution through the year of the rainfall of the plains and Rocky Mountain region. They show the heavy rainfall on the Pacific coast in winter, by which the moist air currents from the Pacific are drained, leaving them to flow over the Rocky Mountains as dry winds; while in Summer these same moist air currents disgorge but little moisture on the hot Pacific coast, and, passing over into the Rocky Mountain region as moist winds, give that country a rainy season in summer.

Epoch Maps, Illustrating American History, by Albert Bushnell Hart. Longmans, Green & Co., New York, 1893.

This little atlas comprises a series of fourteen maps of the United States and North America, illustrating principally the changes of territory in colonial and later times.

It contains a map of the physical features of the United States; a map of North America, showing territorial claims in 1650; of eastern North America, showing the English colonies in 1700; of North America, showing territorial claims in 1750; the English colonies between 1763 and 1775; the United States in 1783, at the close of the Revolution; the accessions of territory to the United States; the status of slavery in the United States in 1801 and 1825; sketches showing the principal territorial controversies between the United States and other Powers; the United States in 1855, 1861 and 1891.

This is a very interesting series of maps, but they give one the impression of being merely samples, since there is a great deal of territorial history to be filled in between the dates which these maps represent. For instance, in the formation of States and Territories there are many events which are not represented here; indeed, those omitted are many times those represented. A full series of such maps illustrating the changes in State and Territorial boundaries is a thing to be desired.

In looking them over we find several minor errors which should be corrected in a future edition. For instance, in map No. 7, Territorial Growth, the southern boundary of the original territory of the United States should be placed throughout on the 31st parallel, as established by the provisional treaty of peace. The Louisiana Purchase should be limited by the boundaries of Texas, the 100th meridian and the Arkansas River, as established by the treaty of 1819 with Spain. At the time of its acquisition it had no well-defined limits. Texas never extended up into Wyoming, but it did extend to the Arkansas River on the north and to the Rio Grande on the west. If there were ever any question about this it is settled by the fact that the United States paid Texas $10,000,000 for the areas ceded, which are now in New Mexico, Colorado, Kansas and Oklahoma. The area south of the 31st parallel, between the Perdido River and Lake Pontchartrain, was long in dispute between the United States and Spain, and in 1812, seven years before the purchase of the Floridas, the United States divided this area among Louisiana, Mississippi and Alabama, but its act in thus disposing of the territory in dispute did not give us jurisdiction over it, since Spain, the owner of the Floridas, was not a party to it.

Oregon is said to have been acquired in 1805 by the Lewis and Clarke expedition. We were not aware that these explorations made acquisitions of territory. The acquisition of Oregon was a gradual process brought about by discovery and settlement, and was not completed until the Webster-Ashburton treaty in 1847.

The last map, showing the status of the States and Territories in 1891, distinguishes the thirteen original States, including Maine, presumably as being a part of Massachusetts. If this be so, there is no good reason for not including Vermont as a part of New York; Kentucky, and, indeed, the whole Northwestern Territory, as a part of Virginia; Tennessee as a part of North Carolina, and Alabama and Mississippi as a part of Georgia.

Referring again to the earlier maps of this little work, it should be said that it is difficult in the extreme to delimit upon maps boundaries which are loosely and vaguely stated in unsettled and unexplored regions, and the author has perhaps done as well as it is possible to do.

Kultur-Karte der V. S. von Amerika, masstab 1:10,000,000, Verlag von R. Oldenbourg in München.

This map makes an attempt to show, on one sheet, a variety of physical and statistical data, including the magnitude of cities, the distribution of the coloured race and the Indians, the iron and coal fields, the wheat, corn and cotton regions, the Great Plains and the arid region, and our railroad system. The mixture thus produced is not very successful, owing to its complexity. The regions are in many cases in nature superimposed one over another, but on the map the right of way is, in some cases, given to one product, at the expense of others. Thus, while cotton and the negro are practically coextensive, the latter's range is greatly restricted on the map in order to show that of the former. Indeed, cotton seems to be the favourite, for its range is made to include much of southern California and central New Mexico. Wheat is similarly forced to give way to corn, and corn to cotton.

Rand, McNally & Co.'s Physical Geography of North America.

This is a wall map, on a scale of about 90 miles to 1 inch, showing by tints the elevation in the following grades:

Below sea level, sea level to 1,000 feet, 1,000 feet to 3,250 feet, 3,250 feet to 6,500 feet, above 6,500 feet.

Isothermal lines are added for certain degrees Fahrenheit for January and July, and the northern limits of certain forms of vegetation are indicated.

It is a very useful map for school and lecture purposes.

Mortalità per Infezione Malarica in ciascun Comune del Regno d'Italia nei Tre Anni 1890–91–92. Scala 1:1,000,000. Direzione Generale della statistica del Regno, 1894.

This map, compiled by Signor L. Bodio, Director-General of Statistics, shows the death rate per 1,000 inhabitants from malarial disease, in ten grades of colour. It shows that in North Italy, including the northern half of the Peninsula, deaths from this disease are comparatively rare, but that southward over the Peninsula, in Sicily and especially in the Island of Sardinia, it is much more prevalent and fatal, particularly in scattered localities.

Geological Map of Alabama with Explanatory Chart, Geological Survey of Alabama. Montgomery, 1894.

The Geological Survey of Alabama has been in existence for twenty-one years, and the publication of this map of the State appropriately marks the attaining of its majority. The energies of the Survey have been very properly directed largely to the solution of economic problems connected with the enormous mineral resources of the State, but this publication affords ample evidence that the purely scientific problems have not been neglected.

The scale of the map is ten miles to the inch, making a sheet 22 by 36 inches within the mat lines. The base, compiled from the Land Office records and atlas sheets of the U. S. Geological Survey, is by far the best map of the State in existence for general purposes. The land lines, while detracting from its appearance, doubtless add largely to its value for many local uses.

The geological formations are represented by a combination of colours and patterns, eighteen distinctions being obtained in the post-Paleozoic and thirteen in the Paleozoic and olden formations. The colours are skillfully selected so as to produce a pleasing effect and at the same time render the map easily read. The larger geological divisions of the State are clearly brought out by the grouping of the colours so that it serves well as a wall map. A careful examination shows that the geological subdivision has been carried fully up to the scale of the map, and in some cases beyond the scale. This is not noticeable in the flat Mesozoic and later formations, but in areas of Paleozoic rocks, particularly where they are steeply inclined, the outlines of the formations are considerably distorted by the exaggeration in width of the outcrops. If the faults of the valley region had been distinguished from the normal formation boundaries by some characteristic line, such as a series of dashes, the reading of the complicated structure would have been greatly facilitated. Of course the position of the faults can be determined in most cases by an examination of the relations of surface outcrops, but there is nothing on the map itself to indicate that some at least of the abnormal contacts may not be deposition unconformities. Considering the scale of the map and the absence of anything to distinguish faults, the highly complicated geology of some portions of the State, particularly of the Coosa valley, is very clearly represented. It is probable that the determinations of the age of some formations in this region are in error. Thus the small areas of sandstone in the vicinity of Rock Run classed as Silurian are without much question Devonian. These areas are small and of comparatively little importance except that they suggest the presence of a shore line in this region in early Devonian time.

The chart accompanying the map gives an excellent résumé of much scientific as well as economic information concerning the State.

Taken altogether this map of Alabama, in pleasing appearance and accuracy of delineation, probably surpasses any other State geological map thus far published, possibly excepting that of Maryland. It is to be hoped that so admirable an example may be followed by other States.

C. W. H.

Geological Survey of New Jersey. Report on Surface Geology for 1894, by Rollin W. Salisbury. From the Annual Report of the State Geologist. Trenton, N. J., 1895.

The three maps which accompany this report possess much interest for students of Pleistocene geology. They cover ground in some measure familiar to many glacialists, and the careful study and accurate delineation of the facts will make this a type region with which others less accessible may readily be compared.

The first of the three maps, prepared with the assistance of Messrs. Kümmell and Whitson, is particularly interesting to all who have followed the discussion concerning the recent formations of northern New Jersey. It is upon the diverse interpretation of these formations and similar ones in other regions that the opposing theories of one or several ice-invasions rest, and their importance has led to extremely detailed examination in the field. Prof. Salisbury represents eight phases of the glacial drift, of which six are extramorainic. Three of the latter are attributed to the last ice-invasion which formed the terminal moraine, and three either wholly or in part to a very much earlier glacial age. The map shows clearly the relations of these different phases of the drift to each other and to the moraine, and if the author's interpretation does not everywhere find acceptance, all will be indebted to him for the admirable manner in which the facts are exhibited.

The second map, prepared by Messrs. Salisbury and Peet, is on a large scale, showing the direction of glacial striæ on the Palisade Ridge opposite New York City. While the facts represented are not of so wide significance, this also is an important contribution to exact glaciology.

The third map, prepared jointly by Messrs. Salisbury and Kümmel, is a large-scale sheet covering the region west of Paterson and Newark, and showing the extinct Lake Passaic. This lake was formed at first by the ice front when it occupied the position marked by the terminal moraine and later by an ice dam at Paterson, the pre-glacial channel of the Passaic through the trap ridges at Milburn having been choked up by the moraine. At the time of its greatest extent the lake had a length of thirty miles and a width of ten. The old shore lines have been traced with evident care and numerous elevations of the various shore features are given. It is somewhat difficult to make out the deformation of the shore lines from these figures, and the isobases showing this deformation on a small diagram in the text might have been printed on the large-scale map with advantage.

C. W. H.

Grundzüge der Physikalischen Geographie von Guatemala. Von Dr. Carl Sapper. Mit 4 Karten. (Ergänzungsheft No 113 *zu "Petermanns Mitteilungen.") Gotha: Justus Perthes, 1894.*

This small work is the most succinct and valuable contribution to the physical geography that has as yet been published concerning any of the Spanish-American countries, and will prove an invaluable work of reference to workers in all lines of physical geography and geology. It represents the scientific results of a long residence by its author in the Republic of Guatemala. Three large coloured maps are appended which, although printed in somewhat incongruous tints, give a clear view of the hypsometric, geological and botanical features of the Republic. The work gives condensed chapters on the geology, orography, hydrography, climatology and plant geography, besides appendices giving a table of altitudes of over 800 points in the Republic, or an average of over seven to the square mile, concluding with a valuable bibliography of previous publications. The value of the geological observations accompanied by a map will be better appreciated when we learn that Dr. Sapper has called to his aid such valuable authorities as Drs. K. A. von Zittel, A. Rothpletz, C. Schwager, E. Nauman, Stoll and Roemer.

To the reader who wishes to obtain a succinct idea of the many grand geological phenomena concentrated in this little country, this will be an invaluable work of reference. The numerous volcanoes, the vast series of both sedimentary and eruptive rocks, including those from Azoic to Pleistocene age, are described in an intelligible manner. It is interesting to note the apparently authentic report upon the occurrence of the older Azoic and Paleozoic rocks in this region which are not well developed elsewhere between the southern line of the United States and the northernmost Republic of South America.

These contributions throw valuable light also upon the relations of the Antillean structure. Furthermore, in the chapter on orography the relations of the various uplifts and geologic evolution of the country are described. The hydrography of the streams flowing into the Bay of Honduras, the Pacific and the inland lakes is set forth with much detail. The chapter on climatology and the geography of the plants is especially thorough, showing a keen appreciation for the collection of just such data as will be of value to all interested in the geographical distribution of plants and animals. A valuable little table shows the range of altitude in which the plants are successfully cultivated, including coffee, cocoa, bananas, sugar, tobacco, rice, corn, and thirty other products.

The distribution and character of the rainfall are given, accompanied by six valuable climatological tables of different localities, giving the humidity, temperature and rainfall.

Could we possess such compact and valuable monographs of other Spanish-American countries and the Antilles, they would greatly aid the solution of many problems of physical geography for which the investigator vainly seeks the literature of those regions.

Map of North Eastern China, by Ch. Waeber, 1893. L. Friederichsen & Co., Hamburg. Relief by crayon shading.

Mercator's projection, scale of midlatitude, 18$\frac{5}{10}$ miles to one inch. This map, in four sheets, represents the country between latitudes 30° and 43° north and longitudes 112° and 125° east. It is of special interest at present, as it represents the seat of war in China.

(*Annales de Géographie, No. 14, 15 octobre, 1894.*) *Carte de l'Indo-Chine, dressée sous les auspices des Ministres des Affaires Etrangères et des Colonies, par M.M. les Capitaines Cupet, Friquegnon, et de Malglaive, Membres de la Mission Pavie. Echelle de 1: 2,000,000. 1895.*

This map shows, in great detail for the scale, the portion of southeastern Asia between latitudes 8° and 24° north, and longitudes 95° and 107° east. Relief is expressed by crayon shading.

Map of part of British and German East Africa, including the British Protectorate of Uganda. Compiled in the Intelligence Division, War Office, under the direction of Lt.-Col. J. K. Trotter, 1894. Scale 25 miles to one inch. Relief by crayon shading.

This map represents that part of East Africa, east of Lakes Tanganika and Albert Edward, between latitudes 7° south and 2° north. Nothing, perhaps, more strongly characterises the rapidity of exploration in this part of the earth than a comparison of this map with those representing the same region a decade ago.

Carta geográfica del Ecuador, por Dr. Teodoro Wolf, publicada por órden del supremo Gobierno de la República, y trabajada bajo las presidencias de los E. E., señores Dr. D. J. M. Plácido Caamaño y Dr. D. Antonio Flores, 1892.

This map, published by Wagner and Debes, Leipzig, is in part a compilation from various sources, ancient and modern, supplemented by the original work of Dr. Wolf. It appears under the auspices of the Ecuadorian government.

The portion of Ecuador west of the main (Eastern) chain of the Andes is represented upon six sheets, on a scale of 1 : 445,000 (about 7 miles to an inch), the relief being expressed in hachures. The portion east of the Andes, occupying part of a single sheet, is represented on a scale of 1:3,000,000 (48 miles to an inch), while the Galápagos Islands are represented on a third scale, that of 1:890,000 (about 14 miles to an inch.)

The map is accompanied by tables giving heights of notable mountains, cities, etc., and a list of the provinces and cantons.

Mapa de la Provincia de Catamarca construido segun datos recogidos y observaciones personales hechas en los años 1887–93 por Gunardo Lange, Ingeniero, Director de la sección Topográfica del Museo, y dibujado por Enrique Delachaux, Cartógrafo, director de la sección Cartográfica del Mismo Establecimiento. 1893. Escala de 1:500,000. Museo de La Plata.

This map, printed in four sheets, forms a part of the Geographical Atlas of Argentina. It has been compiled from authentic data, and from personal observations by Gunardo Lange, Director of the Topographical Section of the Museum. Relief is represented by hachures.

This is a distinct addition to our knowledge of a little known region.

Atlas des Côtes du Congo Français, en vingt deux feuilles, à l'échelle, 1:80,000, Paris, 1893. Publié par le Sous-Secrétariat d'État des Colonies, Service Géographique. Photolithographed.

This map was made from a reconnoissance survey following the coast by Henri Pobequin, chief of station, in 1890 and 1891, using astronomical observations of J. Hansen. It shows little beyond the coast line and the settlements, native and French, upon the coast. Relief is shown crudely by contours at intervals of about 11 metres.

Atlas Général Vidal-Lablache Maître de Conférences de Géographie à l'école normale supérieure. 137 Cartes, 248 Cartons. Index Alphabétique de plus de 40,000 noms. Armand Colin & Cie, Paris, 1894.

This atlas comprises two parts, historical and geographic. In the first part are 52 plates, illustrating the political geography of past times, each plate being accompanied by explanatory notes. The history of the United States for the past two centuries is shown very inadequately on a single plate, while to Europe are devoted 44 plates, and to France alone 12 plates.

The Geographic part is an admirable collection of maps showing relief, climate, vegetation, geology, agricultural products, industries, transportation and political organization. An American might criticise the treatment of the United States in this part also, since only 5 plates out of 79 are devoted to it, while to Africa are assigned 7. The industrial and agricultural maps of this country (which are very small) are open to much criticism. The maps are finely engraved and well printed on heavy paper.

E. Debes, Neuer Handatlas, über alle Theile der Erde, in 59 Haupt- und weit über 100 Nebenkarten, mit alphabetischen Namenverzeichnissen. Leipzig, H. Wagner und E. Debes.

Parts 13, 14 and 15 of Debes' New Hand Atlas of all parts of the Earth have been received. Part 13 contains maps of Western Asia, Australia, and North America, and part 14 a political map of Europe, maps of South America and the Balkan Peninsula. Part 15 contains world maps showing relief and plant distribution, a map of Spain and Portugal, and one of Africa. These are accompanied by full indices. The execution is excellent.

United States Government Maps.

The U. S. Geological Survey has, during the year, issued 62 additional sheets of its great atlas of the United States, increasing the total number thus far published to 752. Of those issued during the past year, 46 are upon the scale of 1:62,500, or about one mile to an inch, and 16 are upon the scale of 1:125,000, or about two miles to an inch. Like the other sheets of this atlas, the relief upon these maps is shown by means of contour lines at intervals ranging from 5 to 100 feet.

Since these sheets constitute the first representation in detail of the country which they cover, they merit a somewhat extended mention. In Maine three sheets have been published. One, called the Bath sheet, shows a part of the intricate fiord-like coast of that State. The others, Norridgewock and Gray, are inland and are characterized by the forms of glacial erosion and deposition, which they represent. The North Conway sheet in New Hampshire shows part of the White Mountains, and the Londonderry sheet of Vermont a portion of the Green Mountains.

Eleven sheets lie in New York. Two, Elizabethtown and Mt. Marcy, are in the Adirondack region, the latter comprising some of the heaviest mountains in that region. Two sheets, the Kaaterskill and Durham, are in the Catskills. Others are in the Hudson and Mohawk valleys. The regions about Niagara Falls and Buffalo are represented upon sheets bearing those names.

From Pennsylvania there are five sheets, all in or near the anthracite region, and they are characterized by the long sharp ridges and narrow valleys of the Appalachian region. Three sheets from Virginia, known as Richmond, Bermuda Hundred and Petersburg, show a region of great interest to the historians of the late civil war. From southern Louisiana come four sheets, all in the delta of the Mississippi, showing the low-lying river ridges upon which the streams flow and the intervening swamps. From Wisconsin there is one sheet, upon which is represented the irregular debris, deposited by the great northern glacier. In the James River valley of the Dakotas are five sheets, showing broad stretches of nearly level land, where the only variations of surface have been produced by depositions from this glacier. In Nebraska and Kansas are ten sheets, representing typical forms of the plains. Two represent a part of the Black Hills of South Dakota. Three sheets represent part of the semi-desert of western Texas.

Three sheets are in southern Montana, embracing the country in the neighbourhood of the Yellowstone River. Two sheets are in Colorado, one upon the plains, and the other, sharply contrasted with it, represents the great mountain mass of Pike's Peak. In central Idaho are five sheets, showing a part of that terra incognita, commonly known as the Salmon River Mountains. There is one sheet in the Sierra Nevada of California, and the list closes with a sheet representing the country about Seattle, Washington.

These sheets are 17½ inches in height by 13 to 15 in breadth, and represent areas, upon the smaller scale, of 900 to 1,000 square miles each, and upon the larger scale, of 225 to 250 square miles each.

The U. S. Coast and Geodetic Survey has published during the year 49 charts, among them being, however, several re-engravings of work published previously on different scales. We note, however, new charts upon the eastern coast of Maine and upon the Alaskan coast. A new edition of the map of Alaska, containing the results of the latest explorations, is one of the above number.

Among them also is the map of the District of Columbia, scale 1 : 9,600, in five-foot contours, published in five sheets. This map, a part of which was published by photo-lithography some years ago upon a scale of 1 : 4,800, is the result of the joint survey executed by the U. S. Coast and Geodetic Survey and the authorities of the District of Columbia. It is very detailed, showing houses, gutters on the sides of the streets, and other minute differences of elevation. Owing to the rapid growth of the city since the surveys were made, the changes consequent upon building operations, the laying out of new streets, cuttings and fillings, etc., have been extensive, and the result is that the map now published fails to represent the country in many places. It is on such accounts questionable whether it is advisable to make so expensive maps as this (it cost $5.00 per acre) for general purposes, or of extended areas.

The United States Land Office has published during the year another edition of its admirable United States map, scale 40 miles to one inch. This is a great improvement in clearness over any previous issue. It has also published maps of Minnesota, Nevada, New Mexico and Montana upon a scale of 12 miles to an inch.

Over a large part of the United States these Land Office maps, which are compiled mainly from the township plats of land surveys, are the only source of information for atlas makers.

The U. S. Hydrographic Office has engraved on copper and published during the year 67 charts of various sorts. Of these, 55 are coast charts of different parts of the earth, 10 of them representing portions of our coast, and 45 relating to foreign coasts. Besides these, many charts of a general character have been published, mainly by lithography. Among them are the Pilot charts of the North Atlantic, issued monthly; of the North Pacific, issued in January and July, and a Pilot chart of the Great Lakes. These charts, besides being of the greatest value to navigators, are of special interest as illustrating the Physical Geography of the sea.

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Boletim, 1894, Nos. 9, 10, 11.

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Third Annual Report of the Council, 1894.

From the Royal Colonial Institute, London :

Report of the Council, Annual Meeting Feb. 19th, 1895.

From the Royal Geographical Society, London :

The Geographical Journal, Vol. 5, Nos. 1, 2, 3.

From the Royal Society, London :

Proceedings, Vol. 57, 3 numbers.

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Vol. 57, Part 4, Dec., 1894.

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Annual Publication, 1894.

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Annual Report of the Board of Directors, and Report of Librarian, 1894.

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Mitteilungen, 2 Reihe, Heft. 7–8.

From the University of Lund, Sweden :

Acta Universitatis Lundensis, Tom. XXX, 1893–4, Parts 1, 2.

From the Société de Géographie, Lyons :

Bulletin, Tome 12, Liv. 8; Tome 13, Liv. 1.

From the Sociedad Geográfica de Madrid:
Boletín, Tomo 36, Nos. 11, 12.

From the Geographical Society, Manchester:
Journal, Vol. 9, Nos. 10–12.

From the Literary and Philosophical Society, Manchester:
Memoirs and Proceedings, Vol. 8, No. 4; Vol. 9, Nos. 1 and 2.

From the Observatorio Meteorológico, Manila:
Observaciones: Oct., Nov., Dic., 1893; Enero, Feb., Marzo, 1894.

From the Société de Géographie, Marseilles:
Bulletin, Tome 19, No. 1.

From Rudolf Mayr, author:
Wien–Chicago, Eine Urlaubsreise. Wien, 1894, 8vo.

From the Observatorio Astronómico Nacional de Tacubaya, Mexico:
Boletin, Tom. 1, No. 20.

From the Observatorio Meteorológico Magnético Central, Mexico:
Anuario Estadístico de la República Mexicana, 1893, Núm. 1.

From the Minnesota Academy of Natural Sciences, Minneapolis:
Occasional Papers, No. 1, Notes on Birds and Mammals, Philippines.

From Elio Modigliani, author:
Fra i Batacchi Indipendenti, Roma, 1892, 8vo.

From Le Prince de Monaco:
Sur la densité et l'alcalinité des eaux de l'Atlantique et de la Méditerranée, par M. J. Y. Buchanan, Paris (1893), 4to; Sur les Premières Campagnes Scientifiques de la Princesse Alice, par Le Prince de Monaco (Paris, 1895), 4to.

From the Academy of Natural Sciences, Geographical Section, Moscow:
Geography (bulletin), No. 3.

From the Director of the Bavarian State Railways, Munich:
Bericht über den Betrieb der kön. bayerischen Verkehrs-Anstalten, 1893.

From the State Board of Health, Nashville:
Bulletins, 1895, Feby. 20, Mch. 20.

From the Tyneside Geographical Society, Newcastle-on-Tyne:
Journal, Vol. III, No. 1.

From Yale University, New Haven:
Catalogue, 1894–95.

From the Geological Survey of New Jersey:
Map of the extinct Lake Passaic (1893); Map showing the dis-

tribution of Intra-Morainic and Extra-Morainic Glacial Drift (1893); Map showing the direction of Glacial Striæ on the Palisade Ridge; Map of the Vicinity of Hibernia, N. J.; Annual Report of the State Geologist for the year 1893.

From the Academy of Sciences, New York:

LYCEUM OF NATURAL HISTORY, Proceedings, pp. 237–300; Annals, Vols. 5–9, and 11.

ACADEMY OF SCIENCES—Transactions: Vol. 2, No. 1, Vol. 11, Nos. 6, 7 and 8; Annals: Vol. 1, Nos. 1–4; Vol. 2, No. 9; Vol. 3, No. 13; Vol. 4, Nos. 8–9; Index to Vol. 7; Vol. 8, No. 1.

From the American Museum of Natural History, New York:

Bulletin, Vol. VI, 1894.

From the Astor Library, New York:

Forty-sixth Annual Report of the Trustees, 1894.

From the Mercantile Library, New York:

Seventy-fourth Annual Report, 1894.

Military Service Institution, New York:

Journal, Vol. 16, Nos. 73, 74.

From the N. Y. State Colonization Society, New York:

Second Report of Prof. O. F. Cook to the Board of Managers, 1894.

From the Naval War College, Newport:

Abstract of Course, 1894.

From the Associação Commercial do Porto, Oporto:

Relatorio dos Actos, etc., 1894.

From the Orenburg Branch of the Imp. Russian Geographical Society, Orenburg:

Bulletin No. 5, 1894.

From the Société de Géographie, Paris:

Bulletin, Tome 15, Trim. 3; Comptes Rendus, 1894, Nos. 18–19; 1895, Nos. 1, 2, 3, 4, 5.

From the Société de Géographie Commerciale, Paris:

Bulletin, Tome 17, Nos. 1, 2.

From the Société de Topographie, Paris:

Bulletin, Dec., 1894.

From the Royal Geological Society of Cornwall, Penzance:

Laws and Rules of the Royal Geological Society; Transactions, Vol. XI, Pt. 9; Eighty-first Annual Report, etc.

From the Academy of Natural Sciences, Philadelphia:

Proceedings of the Academy, 1894, Part 3.

From the Franklin Institute, Philadelphia :
Journal, Vol. 139, 1895, Jan., Feby., March.

From the University of Pennsylvania, Philadelphia :
Catalogue, 1894–95.

From the College of New Jersey, at Princeton :
Catalogue, 1894–95.

From Jacques W. Redway, author :
The First Landfall of Columbus (Washington), 1894, 8vo.

From the Observatorio do Rio de Janeiro, Rio de Janeiro :
Annuario, 1894.

From the Ministero di Agricoltura, Industria e Commercio, Rome :
Istruzione Secondaria e Superiore, Anno Scolastico 1891–92; Istruzione Elementare, Anno Scolastico 1892–93; Statistica delle Biblioteche, Vol. II, 1894; and Vol. 1, Parte 1, 1893; Statistica degli Scioperi avvenuti nell 'Industria e nell 'Agricoltura, 1892–93; Carta della Mortalità per Infezione Malarica, ecc. (2 sheets) (Direz., della Statistica.)

From the Ministero degli Affari Esteri, Rome :
Bollettino, 1894, Nos. 33, 34, 35, 36, 37; 1895, Nos. 38, 39, 40; Bollettino, 1861–1894, 34 vols.

Rivista Geografica Italiana, Rome :
Annata 1, Fasc. 10.

From the Società Geografica Italiana, Rome :
Bollettino, Vol. 7, Fasc. 11–12; Vol. 8, Fasc. 1, 2, 3.

From the Essex Institute, Salem :
Bulletins, Vol. 26, Nos. 1–3, and Geological Map of Essex Co., Massachusetts, by J. H. Sears.

From the Minnesota Historical Society, St. Paul :
Collections, 1894, Vol 6, Part 3.

From the Imperial Academy of Sciences, St. Petersburg :
Bulletin, Vol. 1 (5th series), Nos. 1–4, Vol. 2, No. 1.

From the Imperial Russian Geographical Society, St. Petersburg :
Bulletin, Vol. 30, Nos. 4 and 5; Collections of Ethnography of Smolensk, Memoirs, Vol. 23; No. 2, Pt. 3, Proverbs.

From the Sierra Club, San Francisco :
Bulletin, Jan., 1895; Table of Elevations within the Pacific Coast.

From the Department of Education, San José, Costa Rica :
Boletin de las Escuelas Primarias, Año II, Num. 33, 34, 35.

From the Inspección General de Enseñanza, San José, Costa Rica :
Anuario, Tomo 1, 1892–93.

La Gaceta, San José, Costa Rica :
Año 1, Trim. 1, Nos. 2–15.

From the Oficina Hidrográfica, Santiago de Chile :
Chart; No. 48, Ensenada Tames.—Caleta Lautaro.

From Gustave Schlegel, author :
Problèmes Géographiques : Les Trois Iles enchantées, Leide, 1895, 8 vo.

From the Swedish Government :
30 Statistical Documents.

From the Transbaïkalian Branch of the Imperial Russian Geographical Society, Tchita:
Tibetan Medicine (Bulletin No. 4, 1893).

From the Académie de Toulouse, Toulouse :
Annuaire de l'Université (1894–95); Rapport Annuel du Conseil Général des Facultés, etc.

From the Geographische Gesellschaft, Vienna :
Mittheilungen, Vol. 37, Nos. 10–12.

From the Geological Institute, Vienna :
Verhandlungen, 1894, Nos. 10–18.

From the k. k. Naturhistorisches Hofmuseum, Vienna :
Annalen, Band IX. Nr. 3–4, 1894.

From the American Colonization Society, Washington :
78th Annual Report; Liberia, Bulletin No. 6.

From the Bureau of American Republics, Washington :
Monthly Bulletin for Dec., 1894, Jan. and Feb., 1895; Bulletin, Nos. 54, 57, 58.

From the Bureau of Education, Washington :
Circular of Information, No. 1, History of Higher Education in Rhode Island; No. 2, History of Education in Maryland; Education in Alaska, 1891–92; Report on Introduction of Domesticated Reindeer into Alaska, 1894.

From the Civil Service Commission, Washington :
Tenth Report, July, 1892–June, 1893.

From the Department of the Interior, Washington :
Comprehensive Index of the Publications of the U. S. Government, 1889–93, J. G. Ames; Report regarding the Receipt, etc., of Public Documents, 1892–94; Report on Insurance Business in the United States at the 11th Census, 1890, Part 1.

From the Department of State, Washington :

Consular Reports, Nos. 172 and 173; List of Books, Pamphlets and Maps received at the Library of the Department of State, July–September, 1894.

From the U. S. Fish Commission, Washington :

Report of the Commissioner for the year ending June 30, 1892; Bulletin of the Fish Commission, Vol. 13, 1893.

From the Hydrographic Office, Washington:

Charts: No. 1455, Canada, British Columbia, Waters between Vancouver Island and the Mainland, Burrard Inlet and Cortes Island, including part of the Strait of Georgia; No. 1456, Canada, Ontario, Georgian Bay, Penetanguishene Harbor; No. 1457, Canada, Ontario, Georgian Bay, Killarney Harbor (Shebaonaning); No. 1458, Canada, Ontario, Georgian Bay, Owen Sound; No. 1460, Canada, Harbors in Georgian Bay: French River, Tobermory Harbor, Lion's Head Harbor, Club Harbor, McGregor Harbor, Rattlesnake Harbor; No. 1461, Canada, Ontario, Lake Huron, Georgian Bay, Approaches to Collingwood Harbor (Collingwood Harbor Soundings); No. 1464, Canada, Ontario, Lake Huron, Clapperton Channel; No. 1481, South America, Venezuela, Port Chichirivichi; No. 1482, United States Naval Stations; No. 1484, West Indies, Island of Barbuda; Pilot Charts of the North Atlantic Ocean for January, February, March and April, 1895; Pilot Charts of the North Pacific Ocean for February, March and April, 1895; H. O. Publications: No. 64, Navigation of Caribbean Sea and Gulf of Mexico, Vol. 2, 2d Ed. and Supplement No. 3; No. 73, Ed. of 1884, Newfoundland and Labrador, Supplement No. 3; Sailing Directions for Lake Michigan, Green Bay, and Straits of Mackinac; Special Notice to Mariners for the Great Lakes.

From the Interstate Commerce Commission, Washington :

Preliminary Report on the Income Account of Railways in the United States, to June 30, 1894.

From the National Geographic Society, Washington :

Magazine, Vol. 6, pp. 179–238, Dec., 1894.

From the Navy Department, Washington :

Notes on the Year's Naval Progress to July, 1894.

From the Smithsonian Institution, Washington :

Miscellaneous Collections: No. 854, Geographical Tables, prepared by R. S. Woodward; No. 969, Varieties of the Human Species, etc., by Giuseppi Sergi; No. 970, Bibliography of Aceto Acetic Ester, and its derivatives, by Paul H. Seymour; Special Publication, Diary of a Journey through Mongolia and Tibet in 1891–92, by William Woodville Rockhill.

From the Weather Bureau, Department of Agriculture, Washington:

Monthly Weather Review, September–November, 1894, with Wreck and Casualty Chart of the Great Lakes, 1894; Bulletin C, Rainfall and Snow of the United States to the end of 1891, etc., and Atlas of Charts.

From the Wyoming Historical and Geological Society, Wilkesbarre, Pa.

The Massacre of Wyoming, etc. With an Introductory Chapter by Rev. Horace Edwin Hayden, M.A. Wilkes-Barre, 1895.

From the Worcester Society of Antiquity, Worcester:

Town Records, 1822–1827.

From the Asiatic Society of Japan, Yokohama:

Transactions, Vol. 22, Part 2.

TRANSACTIONS OF THE SOCIETY.

JANUARY–MARCH, 1895.

The Annual Meeting of the Society was held at Chickering Hall, Monday, January 14, 1895, at 8.30 o'clock P.M.

Vice-President Viele in the chair.

The following persons, recommended by the Council, were elected Fellows of the Society:

Leo C. Dessar.
James Loeb.
Cleveland Abbe, Jr.
Allen M. Thomas, M.D.
Richard N. Young.
Cornell Woolley.
R. W. Stevenson.
Robert R. Willets.
James D. Foot.
Cassino M. Wicker.
Chas. Augustin Stoddard, D.D.
Chas. H. Daniels.
Matthew Hale.
M. D. Woodford.
A. L. Washburne.
John K. Farwell.
A. Fillmore Hyde.
Robert C. Sands.
Carleton W. Nason.
Thos. A. Reilly.
W. M. Shaw.
George E. Marcus.
Moses L. Scudder.
Geo. Austin Morrison, Jr.
Waldorf H. Phillips.
C. W. Wells.
Nicholas F. Seebeck.
Ernest Greeff, Jr.
Walter A. Pease.
Oliver G. Jennings.
Francis G. Landon.
George Taylor.
Frederick J. Winston.
Charles T. James.
Francis M. Underhill.
Waldron B. Vanderpoel, M.D.
W. R. Warren.
W. Wheeler Smith.
Hamilton F. Kean.
Edson Bradley.
Emil L. Boas.
Chas. Hare Hutchinson.
Walter D. Starr.
Wm. Henry Russell.
Ewald Mommer.
Carl Pickhardt.
Emerson McMillin.
Robert Sanford.
James W. Phyfe.
Chas. T. Poore, M.D.
Wm. D. Bishop.
M. H. Arnot.
Wm. R. Beal.
Rowland A. Robbins.
Henry C. Rouse.

The Annual Report of the Council was then presented and read:

To the American Geographical Society:

The Council respectfully submits the following Report for the year 1894:

There were during the year 116 deaths and resignations. The number of Fellows is now 1,228, of whom 295 are Life Fellows.

The property of the Society on the Boulevard and 150th Street has been sold to the Hebrew Sheltering Guardian Society for $91,000, and the Council is now able to congratulate the Society on the flourishing condition of its finances. Besides its house, No. 11 West 29th Street, with its increasing library and collections, the Society has now invested in mortgages in Brooklyn, guaranteed by the Title Guarantee and Trust Company and yielding a net interest of 4½ per cent., the sum of sixty-two thousand two hundred and fifty dollars; and on deposit with the United States Mortgage Company, and yielding a net interest of 3 per cent., the sum of twenty-nine thousand seven hundred and fifty dollars.

The Society has also received from the executors of the estate of Gen. George W. Cullum the full amount of the five thousand dollars devised by Gen. Cullum for a Medal Fund, as set forth in his will in these words:

"Thirty-ninth, I give and bequeath to the American Geographical Society, in the City of New York, the sum of Five Thousand Dollars to establish a permanent fund for the purposes comprehended in the general objects of its charter, that is to say: to apply the income to procuring a die, with suitable devices and inscriptions, and to cause gold medals to be struck thereupon and presented from time to time by the said Society to those who distinguish themselves by geographical discoveries, or in the advancement of geographical science, particularly citizens of the United States of America, it being understood that the selection of the recipients of the medals shall be chosen with the assent of not less than two-thirds of the entire Council of the Society, the vote thereon to be taken by ayes and nays, which must be recorded in the proceedings of the Council. I further direct that any losses of any part of this permanent fund shall be made good by the accumulation of the income of the remainder before any further expenditures for medals shall be made. I further direct that this medal fund shall be called the Cullum Geographical Medal Fund."

This amount of five thousand dollars is now on deposit with the United States Mortgage Company at 4 per cent. interest, but the accumulation of income does not as yet warrant the Society's taking the initial steps towards carrying out the provisions of the bequest.

The cash balance in the hands of the Treasurer on the 31st of December was $3,767.70, as appears by his report herewith submitted.

The subject of the erection of a fire-proof building for the library and collections continues to engage the attention of the Council, but the Society is not yet in a position to incur the necessary expenditure.

There were held during the year eight meetings of the Society. Papers were read: by Mr. Carl Lumholtz on the American Cave-dwellers: the Tarahumaris of the Sierra Madre; by Prof. Wm. Libbey, Jr., on his Observations in the Hawaiian Islands; by Kinza Riuge Minamoto, on Japanese Life and Customs, contrasted with those of the West; by Miss C. de Alcalá, on the Wonders of Nature and Art in Spain; by J. Stanley Brown, on the Fur Seals and the Bering Sea Arbitration; by Heli Chatelain, on the Land and People of Angola; by Dr. Lysander Dickerman, on the Condition of Woman in Ancient Egypt; and by Cope Whitehouse, on Nile Reservoirs, Natural and Artificial.

The additions to the Library number 3,151, viz.: Books 561, pamphlets and periodicals 2,174, atlases 64, maps and charts 347, relief maps 5.

All of which is respectfully submitted.

WILLIAM REMSEN,
Chairman.

NEW YORK, Jan'y 5, 1895.

The Report of the Treasurer was then presented and read:

NEW YORK, January 1, 1895.

To the AMERICAN GEOGRAPHICAL SOCIETY:

The Treasurer respectfully reports the following Receipts and Expenditures of the Society for the year ending December 31, 1894:

The Balance in Union Trust Co., Jan. 1, 1894, was		$1,281 95
The receipts have been:		
Dues	$9,195 10	
Interest	647 00	
Sale of Publications	122 00	
Rents	4,000 00	
		$13,964 10
There has also been received from the *Estate of Gen. Cullum* the balance of the Medal Fund		1,750 00
Interest on Cullum Medal Fund		279 49
From the Hebrew Sheltering Guardian Society, proceeds of sale of real estate at 150th Street and the Boulevard		91,000 00
		$108,275 54
The expenditures have been:		
House account	$395 15	
Salaries	5,065 66	
Library	1,420 79	
Lectures	1,297 40	
Publications	1,918 29	
Stationery and Postages	548 09	
Insurance	8 55	
Legal Expenses	48 50	
Miscellaneous	55 41	
There has also been deposited in the U. S. Mortgage Co. on acc't of Cullum Medal Fund, at 4 per cent	1,750 00	
Deposited in the U. S. Mortgage Co., on account of Building Fund, at 3 per cent	29,750 00	
Paid Title Guarantee and Trust Co. for guaranteed mortgages on property in Brooklyn	62,250 00	
		104,507 84
There remains on deposit in the Union Trust Co., January 1, 1895		$3,767 70

NEW YORK, January 1, 1895.

W. R. T. JONES,
Treasurer.

The Committee charged with the duty of selecting candidates for the offices to be filled reported the following names:

To the AMERICAN GEOGRAPHICAL SOCIETY:

The Committee appointed by the Council, December 1, 1894, to nominate suitable persons to fill the offices which become vacant in January, 1895, respectfully recommend the election of the following gentlemen :

For President—Chas. P. Daly, LL.D., term to expire January, 1896.

For Vice-President—Gen. Egbert L. Viele, term to expire January, 1898.

For Treasurer—Walter R. T. Jones, term to expire January, 1896.

For Recording Secretary—Anton A. Raven, term to expire January, 1898.

For Councillors—Levi Holbrook, Morris K. Jesup, Gustav E. Kissel, Henry Parish, Chandler Robbins, terms to expire January, 1898.

W. H. H. MOORE, Chairman, FRANCIS M. BACON, AUSTEN G. FOX,	*Nominating Committee.*

On motion, duly seconded, Mr. Clinton Roosevelt was requested to cast the ballot for the candidates named, and they were declared duly elected.

Mr. Henry Morrison then addressed the Society on the service rendered to the nation in the month of December, 1861, by Chas. P. Daly, President of the Society, who then appeared by invitation before the Cabinet at Washington and clearly demonstrated the illegality of the seizure and transfer of the Confederate envoys, Messrs. Mason and Slidell, from the British Mail Steamer *Trent* to the United States war-vessel *San Jacinto.*

The Chairman then introduced the speaker of the evening, Prof. William Libbey, Jr., who described the observations made during a cruise along the western coast of Greenland in the summer of 1894.

On motion, the Society adjourned.

A meeting of the Society was held at the hall of the American Museum of Natural History, Seventy-seventh Street and Eighth Avenue, on Thursday, January 31, 1895, at 8.30 o'clock, P.M.

Vice-President Viele in the chair.

The chairman introduced to the Society the distinguished African traveller and explorer, Dr. Emil Holub, who delivered an address describing his discoveries and experiences in South Africa.

On motion, the Society adjourned.

A Regular Meeting of the Society was held at Chickering Hall, Fifth Avenue and Eighteenth Street, on Monday, February 11, 1895, at 8.30 o'clock, P.M.

Vice-President Viele in the chair.

The following persons, recommended by the Council, were elected Fellows of the Society:

DR. EZRA P. HOYT.	WM. H. MCCORD.
COL. MASON A. STONE.	HENRY F. QUACKENBOS, M.D.

The Chairman then introduced Wm. Elliot Griffis, D.D., who made an address on Korea and the Koreans, in the Mirror of their Language and History.

On motion, the Society adjourned.

A Regular Meeting of the Society was held at Chickering Hall, Fifth Avenue and Eighteenth Street, on Monday, March 11, 1895, at 8.30 o'clock, P.M.

Vice-President Viele in the chair.

The following persons, recommended by the Council, were elected Fellows of the Society:

JOSEPH R. BIEN.
MURRAY A. POOLE.
VICTOR SORCHON.

The Chairman then introduced the speaker of the evening, Mr. Herbert M. Wilson, Chief Geographer of the U. S. Geological Survey, who delivered an address on the Topography and Scenery of Northern India.

On motion, the Society adjourned.

THE GREENLAND SCIENTIFIC EXPEDITION OF 1895.

The purpose and scope of this expedition, planned by Mrs. R. E. Peary, are set forth in the following circular letters, which embody also the resolution adopted by the Council of the American Geographical Society on the 1st of December, 1894, and correspondence relating thereto with the Secretary of the Navy. The Council, on the 2d of March, 1895, voted an appropriation of one thousand dollars in aid of the expedition, to which generous contributions have been made by the American Museum of Natural History, the Brooklyn Institute of Arts and Sciences, the Newport Natural History Society, and Bowdoin College.

CIRCULARS.

I.

New York, March 8, 1895.

Sir:—Your attention is respectfully called to the following:

On December 1, 1894, the Council of the American Geographical Society passed the following resolution in hearty compliance with an appeal from Mrs. Josephine D. Peary to the Society for its advisory assistance in the organization of an Expedition to ensure the return of her husband, R. E. Peary, C. E., U. S. N.:

"Whereas, R. E. Peary, C. E., U. S. N., in the year 1886 conceived a plan of reconnoissance on the Inland Ice of Greenland, and at his own expense successfully carried out the same over a distance of more than one hundred miles, proving to the scientific world that the ice cap offered an imperial road to explorers of that little-known land; and it is not to be doubted that his discovery cleared the way for Nansen's crossing of Greenland in 1888;

"And in 1891–92 he organized, at his own expense, an expedition to North Greenland, surveyed the unknown shores of Inglefield Gulf, discovered and named, on the 4th of July, 1892, Independence Bay, on the northeast coast, and determined the insularity of Greenland, and the rapid convergence of its shores above the 82d parallel of latitude; and in 1893 he equipped, still at his own expense, and conducted a third expedition to the same desolate region for the purpose of extending the work so well begun; and, when baffled by the unexampled severity of a season, which brought defeat and disaster to every Arctic enterprise of the year, releasing those of his party who preferred to return, he has remained with two volunteers to pass another year in the far North, in order to complete the explorations, which have won for him the hearty admiration of the foremost geographical authorities in every country; and all his undertakings, marked by originality in design, ability in execution, and a courage which never falters, have worthily upheld the honor of the American name;

"Therefore, The Council of the American Geographical Society, in recognition of these facts, respectfully requests the Secretary of the Navy to consider the propriety of dispatching a United States vessel to Northwest Greenland in the summer of 1895, to receive R. E. Peary, U. S. N., and his two companions, and convey them to the United States."

This resolution was sent to Washington on the 7th of December, accompanied by the following letter:

"The American Geographical Society,
11 West 29th Street, New York,
December 7th, 1894.

"Sir:—I beg leave to submit to you the enclosed resolutions unanimously passed by the Council of the American Geographical Society, requesting that one of the cruisers of the U. S. Navy may be sent next summer to the northwestern part of Greenland, where R. E. Peary has established his headquarters, to secure the safe return of himself and his two companions; without which he may, after completing his discoveries, be compelled to remain there for an indefinite length of time, unless some whaling vessel should stop at the place, and this is uncertain.

"The resolutions were passed and are sent under the supposition that the Secretary of the Navy, if he thinks it proper, has the power to do so, and with the impression that it has been done heretofore by the Navy Department in one or two instances.

"It appears to me to be different from the fitting out of an expedition to search for an Arctic explorer who has not been heard from for a long period, which requires a large expenditure and outlay, as the search may extend over a considerable length of time, and its authorization by an Act of Congress may be necessary; but one of our cruisers may in the summer easily go through Melville Bay, which may be crossed in a day or two at that season of the year, and reach Mr. Peary's headquarters at a comparatively short distance to the north of the bay. His intention is to start next March to complete his explorations, and return next August to his starting point—Anniversary Lodge—where he will then be found, whether his discoveries are completed or not.

"It is thought by geographers throughout the world that what Mr. Peary has already done warrants the belief that Greenland, instead of being, as the distinguished German geographer Petermann supposed, a great continent, stretching across the pole, is in reality an island, the farthest northern point of which Mr. Peary has reached, and that his explorations in the coming season, which involve tracing the eastern coast for 300 miles to the highest point attained by the Danish expeditions, will finally establish this important fact.

"Most geographers are inclined to believe that the Arctic basin is surrounded by an archipelago of islands, and this, if shown to be true, will be a very important addition to our knowledge of the physical conditions that exist in the basin of the Arctic; for until we understand what is constantly taking place in that area we shall never be fully acquainted with the laws of the currents of the air and of the ocean.

"The meteorological observations which Mr. Peary has already made, and will continue to make, added to those previously recorded around the circle of the Arctic, may furnish the clew that is wanted to the full comprehension of the movements of the winds and of the waters, and this will be a valuable contribution and assistance to the labors of the Hydrographic Office of the Navy Department.

"I have great confidence in Mr. Peary's ability to achieve what he has undertaken and has already in part performed, for I think he possesses rare qualities as an explorer, and foremost among them is his power of seeing in advance what is requisite for the successful conduct of an expedition.

"Mr. Peary has become so widely known by the course of lectures which he gave throughout the United States in order to obtain the funds for his last enterprise, and so much interest has been felt by the numbers attending these lectures, that I feel assured that the sending of a cruiser to insure his safe return will be regarded by the public as a creditable act on the part of the Navy Department, which has already recognized the importance of his undertaking by granting him, on two occasions, the necessary leave of absence.

"Altogether, with the fund raised by his lectures and his own private fortune, Mr. Peary has already expended about $60,000 in his praiseworthy efforts to extend our knowledge of the globe which we inhabit; and, as I have said, this act of attention towards him on the part of the Secretary of the Navy will meet the unqualified approval of the American people.

"I am, Sir, with high respect, your obedient servant,
Chas. P. Daly, *President.*

"The Hon. *The Secretary of the Navy,*
"Washington."

On the 19th of January, 1895, a reply was received, of which the following is a copy:

> "NAVY DEPARTMENT, Washington, January 18, 1895.
>
> "SIR:—Replying to your letter of the 7th ultimo, transmitting copy of resolutions passed by the Council of the American Geographical Society, requesting that a naval vessel be sent next summer to the northwestern extremity of Greenland to bring Civil Engineer R. E. Peary, U. S. Navy, and his companions to the United States, I have to inform you that this Department has no available vessel which would be suitable to perform this duty.
>
> "Even had the Department a suitable vessel available for such duty, no action could be taken in connection with the expedition of Mr. Peary, which is a purely private enterprise, without special authority from Congress and an appropriation to meet the necessary expenses.
>
> "Very respectfully,
> "H. A. HERBERT, *Secretary.*
>
> "Mr. CHARLES P. DALY, *President American Geographical Society,*
> "11 West 29th Street, New York City, N. Y."

It is evident that only private enterprise and generosity can be relied upon for the relief of the intrepid Peary.

It is proposed to send an expedition to accomplish this, and at the same time to further scientific research. For particulars of the proposed plan and the scope of the undertaking, with the scientific results to be expected, reference is respectfully made to the accompanying paper.

A properly equipped expedition will cost $12,000.

The New York Life Insurance and Trust Company, 52 Wall Street, New York City, have consented to receive contributions and disburse the same on orders from the Business Manager of the expedition.

The following resolution was passed by the Council of the American Geographical Society at its meeting on March 2d, 1895: "*Resolved*, That the American Geographical Society heartily approves Mrs. Josephine Diebitsch Peary's project for the relief of Mr. Peary, and the prosecution of Arctic scientific research, and that it hereby contributes one thousand dollars towards the expenses of such expedition, provided that other subscriptions sufficient to make up the sum required to send the expedition are obtained by Mr. Diebitsch."

If you are willing to aid in equipping the proposed expedition, will you have the kindness to fill out the blank below, and return it to the Business Manager of the Greenland Scientific Expedition of 1895, as soon as possible.

EMIL DIEBITSCH,
Business Manager of the Greenland Scientific Expedition of 1895,
2014 Twelfth St., N. W., Washington, D. C.

In behalf of Mrs. Josephine Diebitsch Peary.

We, the undersigned, are heartily in favor of the proposed expedition, and agree to contribute the sums set opposite our respective names, it being understood that subscriptions shall not be binding until the entire amount required is subscribed, when all shall become immediately due and payable.

SUBSCRIBERS.	AMOUNT.

2.

THE GREENLAND SCIENTIFIC EXPEDITION OF 1895.

Efforts are now making to raise a fund of $12,000 for the purpose of bringing Mr. Peary and his two assistants home from Northwest Greenland early next fall, and, in connection with this, to prosecute scientific investigations during the available summer season. It is hoped, by this means, to charter and fit out a staunch steamer built for Arctic service and commanded by experienced Arctic navigators, which shall start from St. John's, Newfoundland, on or about July 5, 1895, for Inglefield Gulf, Northwest Greenland, lat. 78° N., Mr. Peary's headquarters. The co-operation of Museums, Scientific and Educational Institutions and individuals is invited, not only because they will thus assist in the return of Mr. Peary and in the preservation of the results of his extended labors, but also because such an expedition will afford the most favorable advantages to eight or ten specialists for obtaining the rich results that are possible in a prolific field that, for a generation to come, may not again be easily and economically accessible.

These Arctic waters have been traversed eight times without an accident by the four Peary expeditions, 1891–94. No Arctic authority will dispute the feasibility of carrying on the work now proposed.

If any members of the party desire to await in the vicinity of Godhavn, Disco Island, the return of the vessel, facilities will be found here for transportation to the neighboring mainland which, with its ice cap, its giant glaciers, its great sheets of overflow lavas, its abundant fossil remains and its large variety of Arctic flora and fauna, will reward research with many valuable results.

The vessel should reach the coast of Greenland by July 10 or 12, and should be able to arrive at Mr. Peary's camp late in July or early in August, if it is deemed best to make only few and short stops on the northerly trip. There will then remain four or five weeks for investigations in that exceptionally advantageous region, and still leave some time for work at more southerly points, where, owing to the influence of the East Greenland current, the conditions are unfavorable in the early part of the season. After the severe season of 1893–94 an open passage through Melville Bay and a favorable summer may reasonably be expected this year.

Glacial Researches.—Every scientific member of the four Peary expeditions gives his hearty endorsement of the plans for next summer's campaign. Professor T. C. Chamberlin, head Professor of Geology in the University of Chicago, and a member of the expedition of 1894, writes of the special advantages offered for glacial researches:

"The more I work upon the results gathered last summer, the more I congratulate myself upon having made the trip. The results grow constantly upon me, both in respect of their instructiveness and their fundamental importance. Surely no field is likely to be found which throws clearer light upon the problems of glaciology than the northern portion of Greenland. The facilities for study there presented are truly remarkable. The ends and sides of the glaciers are truncated, revealing their internal nature and their methods of work to a degree that could not well be anticipated."

Professor W. Libbey, Jr., Professor of Physical Geography at Princeton University, and the geographer of the Peary Auxiliary Expedition of 1894, writes:

"The careful investigation of the Greenland glaciers cannot fail to throw great light upon the discussion of the character and extent of the ice masses of the glacial epoch. The physical characteristics of the ice itself are worthy of attention because of their influence upon the motion of the ice. The contrast presented by these glaciers to the Alpine type is very great, and their study will amply reward any attention given to them."

On Bowdoin Bay in Inglefield Gulf Professor Chamberlin found, last summer, nine glaciers of varying forms and habits, within a half dozen miles. It is hardly possible to find any point north of Cape York where glaciers and ice caps profitable for study are not near at hand.

Zoological Work.—The study of marine life should be pursued upon a systematic plan. The results attained by the Peary Auxiliary

Expedition of 1894 clearly indicate that this work may be carried on with profit, and that large additions may be made to our knowledge of marine forms of Arctic life. Mr. C. E. Hite, of the University of Pennsylvania, a member of the Peary Auxiliary Expedition of 1892, says that the dredging results were remarkable for variety and interest. Professor Chamberlin says that in his opinion the glacial and biological lines in particular may be worked harmoniously together. Not a few of our museums desire specimens of walrus, with which these waters abound. In 1893 Mr. Peary secured over twenty of these animals in a few days' hunt. White whale, seal, narwhal, reindeer, Arctic hare, blue fox, birds of various kinds, and insects may also be procured.

Ethnological Studies.—The Anthropologist can hardly experience anything more instructive than first contact with the native or pure Eskimos, who, by isolation, have been preserved, in all respects, as the most primitive of human beings. They are to be found only in an almost inaccessible district of East Greenland and along the coast line, soon to be visited, between Cape York and Inglefield Gulf. Ethnological collections of great interest may be made at almost every point. The materials furnished by these people would equip a full ward in any Ethnological Museum; and here the primitive phase of developmental anthropology may be studied with the greatest advantage.

Botanical and Other Work.—Complete botanical studies in this region, whose flora is developed in considerable variety by the continuous sunlight of a few short months, will be of much interest. It is desired also that artistic and excellent results of photography be secured in large variety. The photographs of glaciers already brought from this region show that nothing can be more helpful to the study of these phenomena than the graphic pictures revealing every phase of glacial activity. This region will afford to all the lines of work here mentioned nearly equal opportunities and very valuable results.

A landscape painter would find here a unique and most inviting field. The scenic aspects of the Inglefield Gulf region, with its towering heights, its mighty glaciers, and its native hamlets, would enable an artist to fill his portfolio with material of great variety and interest secured within 800 miles of the North Pole.

Mr. Peary, who has done great service in opening this interesting region to scientific study, will render every aid in his power to the expedition. His thorough knowledge of the natives, of methods of travel and work, and of points of interest, will greatly facilitate the present undertaking; and conspicuous among its results will be the fact that it will bring back, not only the fruits of its own labors, but also the product and records of the able and brilliant explorer who, for several years, has devoted all his time, energy and money to the study of Arctic life and phenomena, and to widening the bounds of geographic knowledge in the North Polar area.

The following resolution was passed by the Council of the American Geographical Society at its meeting on March 2, 1895: "*Resolved*, That the American Geographical Society heartily approves Mrs. Josephine Diebitsch Peary's project for the relief of Mr. Peary, and the prosecution of Arctic scientific research, and that it hereby contributes one thousand dollars towards the expenses of such expedition, provided that other subscriptions sufficient to make up the sum required to send the expedition are obtained by Mr. Diebitsch."

The business management of the expedition will be in the hands of the undersigned, Mr. Emil Diebitsch, who was a member of the expedition of 1894.

A limited number of Scientific Societies, Educational Institutions, or individuals, contributing $1,000 to the fund will be entitled to have each a representative on the Expedition, who shall be approved by the scientific leader. The expenses of each member over and above $1,000 will be the cost of his scientific outfit, transportation from his home to St. John's, and from New York or Philadelphia to his home. The proposed work will require three months.

All communications and requests for further information should be addressed to

EMIL DIEBITSCH,
Business Manager of the Greenland Scientific Expedition of 1895,
2014 Twelfth St., N. W., Washington, D. C.

In behalf of Mrs. Josephine Diebitsch Peary.
WASHINGTON, March 8, 1895.

3.

2014 12TH STREET, N. W.,
WASHINGTON, D. C., March 19, 1895.

SIR:

I would respectfully call your attention to the accompanying circular, and would particularly emphasize the following additional remarks:—

In the preparation of his Greenland expeditions Mr. Peary has always made ample provision for his return. Such was also the case in the last expedition, and the ship arrived at headquarters last July, and brought home those of his party who wished to return.

Mr. Peary, however, felt that his plans of last spring had been defeated by the very exceptional weather which proved disastrous to nearly all expeditions that ventured into the Arctic region last summer, and determined to make another attempt to cross the ice-cap in the spring of 1895. He believed that the results which he has already achieved would insure for him the assistance of all scientific societies and individuals, and, strong in this belief, with two trusty companions, he remained at his post.

Should your society not desire to be represented on the expedition I sincerely hope that you will nevertheless make some contribution toward the fund that we may place your name on the list of patrons of this worthy enterprise.

Respectfully yours,

JOSEPHINE D. PEARY.

SIXTH INTERNATIONAL GEOGRAPHICAL CONGRESS,

London, 1895.

Invitation Circular.

GENERAL INFORMATION.

1 Savile Row, London, W.
December 5th, 1894.

The Organising Committee of the International Geographical Congress cordially invite all Members of Geographical Societies, and all who take an interest in any of the various aspects of Geography, to attend the Meetings of the Sixth International Geographical Congress, which will be held in London from 26th July to 3rd August, 1895.

The Headquarters of the Congress are at the House of the Royal Geographical Society, 1 Savile Row, Burlington Gardens, London, W. The Society, as representing the Geographers of the United Kingdom, offers to all Members of the Congress the privileges of Fellows during their stay in London. The Rooms of the Society, including the Library and Map Room, will be open during the Congress, and officials of the Congress will be in attendance to render assistance to Members. It is hoped that arrangements may be made by which the Meetings of the Congress, as well as the Exhibition, may be held in the Imperial Institute, South Kensington. In any case interpreters will be in attendance at the meeting place to assist Members who are unfamiliar with the English language. If held at the Institute, Members of the Congress would be accorded the privileges of Honorary Members of the Imperial Institute during the Meeting, and would be able to make use of the Reading Rooms, Dining Rooms and Gardens, and to receive letters at the Institute.

A general programme, with the complete local arrangements, will be forwarded to all Members at least a month before the meeting takes place. A detailed programme for the meetings of the day will be distributed to the Members early each morning at the Reception Room. This programme and all the official documents of the Congress will be printed in French and English.

Such special information as may be considered necessary will be compiled and sent to those who signify their intention of attending the Congress, or will be given to Members on their arrival.

The following Guide Books to London are recommended as trustworthy:—

Baedeker's *London and its Environs* (English, German and French editions). 1894. 6*s.*

Dickens' *Dictionary of London.* 1894. 1*s.*

Fry, *London in 1894.* W. H. Allen & Co. 2*s.*

Joanne, *Londres, &c.* Hachette. 6 fr.

The Maps and Plans in Baedeker are amply sufficient. To those desirous of having a separate map the following may be recommended:—

Stanford's New Map of the County of London on the scale of 4 inches to 1 mile. 20 sheets in portfolio. 1894. 16*s.*

Bartholomew's Map of London. W. H. Smith, 1893. 1*s.*

Bartholomew's Pocket Atlas and Guide to London. John Walker. 1*s.*

Philip's Handy-volume Atlas of London, containing a large scale street plan (in 55 sections on a scale of 3 inches to 1 mile), &c. 1891. 7*s.* 6*d.*

Geological Map of London and its Environs. Stanford. 5*s.*

The Subscription payable by Members, either ladies or gentlemen, is £1 sterling. On payment of 10*s.* extra a Member can obtain a transferable lady's ticket, which will admit a lady to all meetings, although it does not entitle its holder to vote in the deliberations of the Congress, or to receive copies of any publications which may be distributed to Members.

Intending Members are particularly requested to intimate their intention to the Secretaries as soon as possible, in order that their names and addresses may be registered, and all subsequent communications concerning the Congress may be sent to them.

Any one may become a Member of the Congress by enclosing his name and address, with £1 sterling, to the Secretaries of the Sixth International Geographical Congress.

Subscriptions may be paid in advance, and a receipt will be sent when the money is received. The production of this receipt will entitle the holder on arrival in London to tickets for the meetings of the Congress. If more convenient, payment may be made at the Reception Room, but no person can be admitted to any meeting or to the Exhibition without a ticket.

It is hoped that special arrangements will be made with Continental and British Railways by which Members of the Congress will be conveyed to and from London at cheap rates. In order to take advantage of these arrangements it will be necessary to show either the ticket of membership or the receipt for the subscription.

Evening Receptions, afternoon parties, and excursions to places of geographical interest are being arranged for, and when the plans are completed they will be duly announced to all who intimate their intention to be present.

Patron.

HER MOST GRACIOUS MAJESTY
THE QUEEN OF GREAT BRITAIN AND IRELAND,
EMPRESS OF INDIA.

Vice-Patron.

H.R.H. THE PRINCE OF WALES, K.G., K.T., K.P., &c.

Honorary Presidents.

H.M. THE KING OF THE BELGIANS,
Sovereign of the Congo Free State.
H.R.H. THE DUKE OF CONNAUGHT, K.G., K.T., K.P.
H.R.H. THE DUKE OF YORK, K.G., K.T., &c.
Honorary President of the Royal Geographical Society.

President.

THE PRESIDENT OF THE ROYAL GEOGRAPHICAL SOCIETY.

EXECUTIVE COMMITTEE.

The PRESIDENT OF THE CONGRESS and the CHAIRMAN and SECRETARIES OF THE ORGANISING COMMITTEE are members of all Committees, and form an Executive Committee to carry out the arrangements for the Congress.

PROGRAMME OF SUBJECTS.

As intimated in a previous circular, the general heads under which the subjects to be dealt with at the Congress will be grouped are as follows:

I. Mathematical Geography.
II. Physical Geography, including Oceanography and Geographical Distribution.
III. Cartography.
IV. Exploration.
V. Descriptive Geography.
VI. Historical Geography.
VII. Applied Geography, including Anthropo-Geography.
VIII. Education.

The Organising Committee, after consultation with eminent Geographers of various countries, have made definite arrangements for the treatment of certain selected subjects which they consider of special importance. In each case the subject will be introduced by a paper by a leading authority, to be followed by a discussion in which other specialists have agreed to take part; but the discussion will in each case be open to any member. The subjects thus provisionally arranged for, and the specialists who are expected to treat them, are as follows. The names of those who have definitely promised to read papers are printed in SMALL CAPITALS; it is hoped that the others whose names are given, and from some of whom no replies have been received at the date of issue of the Circular, will at least take part in the discussions.

I. MATHEMATICAL GEOGRAPHY.

1. The Distribution of Density over the surface of the Earth in relation to the Force of Gravity.
2. Geodesy in relation to the Survey of India.
   General J. T. WALKER, C.B., F.R.S.
3. Photographic Methods in Surveying.
   Colonel H. C. B. TANNER.

II. PHYSICAL GEOGRAPHY.

1. International Co-operation for the Study of the Oceans.
   The Prince of Monaco.
   Professor Otto Krümmel.
   Professor Otto Petterson.
   Professor Thoulet.
   Mr. J. Y. Buchanan.
   Professor Alexander Agassiz.
2. Limnology and Hydrology as a Branch of Geography.
   Professor FOREL.
   M. Delebecque.
   Professor Penck.
   M. Marinelli.
   Dr. H. R. Mill.
3. A Systematic Terminology of Land Forms.
   Professor PENCK.
   Professor W. M. Davis.
   Mr. H. J. Mackinder.
   Professor Dr. F. Freiherr von Richthofen.
   Mr. H. Yule Oldham.

III. CARTOGRAPHY.

1. On the Construction of Globes.
   Professor ELISÉE RECLUS.
2. REPORT of Committee on Map of the World on scale of 1 : 1,000,000.

IV. EXPLORATION.

1. The Polar Regions.
    - (*a.*) Arctic.
        - Admiral A. H. MARKHAM.
    - (*b.*) Antarctic.
        - Dr. NEUMAYER.

V. DESCRIPTIVE GEOGRAPHY.

1. REPORT on an International Bibliography of Geography.

VI. HISTORICAL GEOGRAPHY.

1. History of Early Charts and Sailing Directions.
    - Baron NORDENSKIÖLD.
    - Mr. H. Yule Oldham.

VII. APPLIED GEOGRAPHY, INCLUDING ANTHROPO-GEOGRAPHY.

1. To what extent is Tropical Africa suited for development by the White Races or under their superintendence?
    - Sir JOHN KIRK.
    - Dr. Dove.
    - Mr. E. G. Ravenstein.
    - M. Lionel Dècle.
2. The Influence of Land Forms and Surface Characters on Occupation, Settlement and Lines of Communication.
    - Mr. H. J. MACKINDER.
    - Professor W. M. Davis.

VIII. EDUCATION.

Geography in the School and University.
- Professor E. LEVASSEUR.
- Professor Lehmann.
- Mr. Douglas W. Freshfield.

These discussions will occupy only a portion of the time of the Congress, and the Committee invite contributions on other subjects indicated in the general programme. All contributions thus sent in will be most carefully considered by the Committee, and such of them as are considered suitable will be allotted a place in the programme of proceedings as far as time permits.

Even on the subjects for which definite arrangements have been made additional contributions may be sent, and these will be considered.

As the Congress is International it is proper that the subjects submitted for consideration should be of wide importance and of permanent interest.

When the Committee have definitely selected the papers to be brought before the Congress it will be decided to what extent, if at all, the Congress will be divided into groups or sections for the purpose of holding meetings. But in any case Sessions will be so arranged that as far as possible all the subjects for discussion and consideration will be brought before all the Members. When necessary Committees will be appointed to deal with special subjects.

It is requested that contributors of papers to the Congress will send their complete manuscript (preferably type-written) before the end of April, 1895. This must be accompanied by an abstract not exceeding in length 1500 words.

Communications intended for the Congress may be written in English, French, German or Italian. In the case of papers accepted by the Committee the abstract will be printed in English and French, for distribution among the Members of the Congress on the day on which the subject is to be introduced. The Committee reserve to themselves the right of limiting the time to be allowed to each speaker.

Having regard to the difficulties and dissatisfaction which have arisen at previous Congresses, in consequence of the short notice given of the subject of important resolutions which come up for discussion and are subsequently voted upon, it has been decided that any Member desiring to bring forward a resolution for discussion shall forward the same in writing to the Secretaries not later than July 1st, 1895. All resolutions received in this manner and accepted as suitable for consideration, will be printed and distributed to all Members, and the time for their discussion announced in advance.

PROGRAMME OF THE EXHIBITION.

It has been decided to hold an Exhibition in connection with the Sixth International Geographical Congress.

The Exhibition will include:—

I. *Instruments.*—(1) Those designed for taking precise observations to be used in the construction of maps: (a) for the measurement of length, (b) for the measurement of arc.

(2) Other instruments useful for general observations by travellers.

(3) Instruments and apparatus employed in oceanographical and limnological research.

(4) Series illustrating the history of instruments used for national surveys and by travellers and navigators.

II. *Maps.*—(1) Historical series to show the development of cartography.

(2) Representative series of the best existing maps: (*a*) Physical, (*b*) Geological, (*c*) Cadastral, (*d*) Military, (*e*) Railway and Telegraph, (*f*) Statistical, showing distribution of population, races, religion, natural resources, cultivation, fauna and flora, &c., (*g*) Educational Maps.

(3) Historical series of Atlases.

(4) Travellers' Field Sketches.

[Under head (2) *specimens only* and *not complete series* of the various classes should be sent.]

III. *Globes*, *Reliefs*, *Models*, and all other special appliances for use in geographical education. [Specimens only to be sent.]

IV. *Photographs and Pictures.*

(1) Collections of typical photographs and pictures from the geographical standpoint.

(2) Lantern slides illustrating characteristic scenery, racial types, and industries dependent on geographical conditions.

V. *Equipment for Travellers*, including (1) Models of tents, conveyances, camp gear, &c., for use in all climates and at all altitudes; (2) Appliances adapted for the use of travellers.

VI. *Historical Mementoes.*—Portraits of explorers, relics of exploring expeditions, and miscellanea of interest in connection with the history of exploration.

VII. *Publications.*—Specimens of publications of Geographical Societies, and specimens of geographical literature of special interest.

VIII. *Collective exhibits* comprising any of the above, lent by Governments, Government Departments, Scientific Societies, or other public bodies.

The Committee desire to make the Exhibition as fully representative as possible of the present state and past history of geographical science.

It is intended that the Exhibition should be International, and it is therefore hoped that contributions will be received from all the countries taking part in the Congress.

It is hoped that among the delegates appointed by any Government one may be specially charged with the duty of superintending the collections exhibited by that country. The necessary space will, as far as possible, be provided, but the Committee regret that they are not in a position to undertake any expenses connected with the carriage or installation of colonial and foreign exhibits. The Committee will be glad of early intimation of the character of the exhibits and the space likely to be required by any exhibitor.

In every case this information should be sent and a reply awaited, before the exhibit is despatched.

The contributions from the United Kingdom will probably be of two classes: (*a*) those lent by public departments, institutions, or private individuals, and (*b*) trade exhibits shown by the manufacturers.

(*a*) *Loan Exhibits.*—Expenses connected with any loan exhibits accepted by the Committee may, in certain cases, be defrayed by them; these will include freight, installation and insurance against fire. The Committee can accept no general liability in respect of loss of, or injury to, the articles shown, although the utmost care will be taken of them. The Committee must of necessity reserve absolute discretion as to the acceptance or rejection of any exhibit.

(*b*) *Trade Exhibits.*—The Committee hope that contributions from makers of, and dealers in, appliances, instruments and other articles of the character intended to be shown, will form an important and interesting portion of the Exhibition.

The Committee therefore wish to impress upon possible exhibitors that only articles of genuine geographical character can be admitted. For such articles they will provide as much space as may be available. The Committee will be sole judges of the suitability of any exhibit. All expenses connected with freight and installation, &c., of such goods must be paid by the exhibitors.

A Catalogue of the Exhibition will be published, in which a limited number of advertisements will be admitted.

As soon as further information is available as to the locality and area of the Exhibition, a special Exhibition circular will be published. In the meantime all communications should be addressed to—

The Secretaries,
International Geographical Congress,
1 Savile Row, London, W.,

and marked *Exhibition* on the outside of the envelope.

In order that the meeting of the Congress should be useful and successful, it is necessary that the regulations as to the contribution of papers to be read, of resolutions to be discussed, and as to the arrangements for the Exhibition, be rigidly adhered to.

By authority of the Organising Committee,
LEONARD DARWIN,
Chairman of Committee.

J. SCOTT KELTIE, } *Secretaries.*
HUGH ROBERT MILL, }

5th December, 1894.

BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY.

Vol. XXVII **1895.** **No. 2**

A JOURNEY UP THE YUKON RIVER.

BY

ISRAEL C. RUSSELL.

The Yukon river has its source in the mountains near the coast in the northwestern portion of Canada and flows in a curving course, first northwest and then southwest, through Alaska and empties into Bering Sea. Its length, including its many windings, is from 2,000 to 2,500 miles; and the area it drains in the neighborhood of 440,000 square miles. Next to the basin of the Mackenzie, the region drained by Alaska's great river is the least known of any of the larger river valleys of North America.

In the summer season of 1889, I accompanied an expedition sent out by the U. S. Coast and Geodetic Survey for the purpose of marking the localities where the Alaska-Canadian boundary crosses the Yukon and Porcupine rivers, respectively. My connection with the expedition was that of a geological *attaché*, as I was sent by the Director of the U. S. Geological Survey, for the purpose of making such observations on the character and resources of the country as the nature of the journey would allow. The expedition consisted of two independent parties in charge of Mr. J. E. McGrath, and Mr. J. H. Turner.

Preparations for a two years' sojourn in the Arctic were made in San Francisco, and on June 14 we sailed for Unalaska, on the steamer *Bertha*. After a brief stay at Unalaska, during which our equipage was transferred to the steamer *St. Paul*, we crossed Bering Sea, and on July 7 anchored in shallow water about a mile off shore, near the little trading station known as St. Michaels. This is the customary point for transferring to river steamers in order to ascend the Yukon, the nearest entrance to which is about 70 miles to the south. Owing to shallow water and the absence of surveys, ocean-going vessels do not attempt to enter any of the many mouths into which the Yukon divides before reaching Bering Sea.

St. Michaels is considerably changed from the Redoubt St. Michaels', founded by the Russian American Fur Company in 1833. The palisade of the old stronghold is gone, but two of the block houses, pierced for cannon and musketry, still stand at the rear of more modern buildings, and occasionally serve as guard houses. The octagonal church, painted red and surmounted by the double cross of the Greek church, tell that the established religion of Russia still holds sway, although the flag of the United States floats near at hand. The settlement is still a trading post, but has passed into the hands of the Alaska Commercial Company, who, at the time of our visit, held the lease of the Seal Islands, and controlled the entire fur trade of western and central Alaska. The principal buildings are built of logs, the better ones having an outside covering of boards, and form three sides of a rectangle. The space thus enclosed corresponds in a general way to the plaza in a Mexican village, and is the scene of many picturesque gatherings.

The little settlement had just awakened from its winter's sleep, and was thronged with natives from villages scattered along the coast and from several widely separated points in the interior. The most distant travellers were from the Porcupine river to the east of the Alaska-Canadian boundary, some 1,500 miles away. Besides the natives there were missionaries of several denominations; agents of "The Company" from interior stations, miners from the gold fields on the upper Yukon, officers and sailors from the U. S. S. *Thetis*, anchored in the roadstead, a number of mechanics brought on the *St. Paul* who were to construct a new steamer for the Yukon trade, and the Coast Survey parties, numbering over twenty men. A more cosmopolitan assemblage could scarcely be found in North America outside of Alaska. The natives represented several of the subordinate divisions of the two great aboriginal stocks, Eskimo and Indian, of North America. The white men included but few native-born American, but nearly every country of Europe from Finland to Greece was represented. As is the case the world over when a band of adventurers assemble, the Jew was present, and as usual ranked among the more prosperous members of the community.

The gathering of so many strangers at St. Michaels gave the place a holiday aspect. To entertain the visitors, the traders in charge of the station arranged for a native dance in the square in front of the store, in which a score or more of the Eskimo inhabitants participated. The audience consisted of white people, including the wives of some of the traders, Indians, Eskimos, children, dogs, etc., and was even more picturesque than the dancers, clad in their holiday garments of seal skin and reindeer fur. Music was furnished by a number of tambourine-like instruments, made of seal-membrane stretched tightly over a frame shaped not unlike a tennis racket, and beaten by the hand. Various phases of Eskimo life, including hunts on sea and land, were described in extemporized chants, accompanied by pantomime, in time with the music. Some of the very oldest members of the community, carried away by the excitement of the occasion, joined in the festivities, and showed how such events were celebrated when they were young, much to the amusement of the rising generation.

While the *St. Paul* was slowly discharging her freight with the assistance of lighters, and of a small steamer called the "*Yukon*," in which we were to ascend the great river after which it was named, the scientific work of the expedition was begun by Messrs. McGrath and Turner, who made magnetic observations in tents on shore. My time was occupied in tramping over the adjacent moorland and in climbing some of the low volcanic hills a few miles inland. The country about St. Michaels is typical of a vast region bordering the shores of Bering Sea and the Arctic Ocean, for which the Siberian name *tundra* has been adopted. This desolate tract is a treeless morass, carpeted with a luxurious growth of mosses and lichens, and beautified during the short summer by a wealth of brilliant blossoms. A few inches below the flower-strewn surface, however, the soil is always frozen and a sheet of ice more or less mixed with partially decayed vegetation, and of unknown thickness, underlies nearly the entire tundra country. Like the peat bogs of temperate latitudes, the plants of the tundras grow above at the same time that they die and partially decay below, but complete destruction of the vegetable tissues is arrested by the frost, and the deposit increases in thickness from year to year and from century to century. In the frozen bogs forming a belt a hundred miles or more broad, about the northern shores of both the Old and the New World, it is safe to say there is more carbonaceous matter than in the workable coal fields of America. Geologists may yet find in the northern bogs an explanation of the origin of some coal deposits. The surface of the tundra abounds in lakes and ponds, and, in fact, in many places contains more water than land; or, rather, there is scarcely any land at all over large areas, but only hummocks of wet moss into which one sinks knee deep at every step.

When preparations were finally completed and the little stern-wheeled steamer *Yukon* was loaded for the river journey, those who were to take passage in her carried their personal effects on board and settled down in the cramped and not over-clean quarters as best they could. Beside the freight stowed away, no one seemed to know where, on the steamer itself, three lighters were taken in tow, each of which was heavily laden, and served also to house the camp hands, and a few other passengers. Meals were served in the diminutive cabin of the steamer, and, as many relays were necessary, a meal, or the odor of its preparation by the Eskimo cook, seemed always in progress.

The crew of the *Yukon* consisted of a captain of Scandinavian birth, an engineer from Finland, and a dozen or more Eskimos. The natives acted as pilots, assistant engineers, firemen, wood choppers, etc., and did their work with remarkable efficiency. Even when the rough captain was too drunk to manage affairs, the crew navigated dangerous rapids, and made landings for wood, in a way that spoke volumes for their intelligence and faithfulness.

The first stage of our journey was along the coast of Bering Sea, and was a risky passage for the *Yukon*, especially when encumbered with lighters in tow. The weather was calm, however, and the water smooth. In spite of a dense fog that settled down over the yellow sea, before the passage was half completed, we succeeded in reaching Kwikhpak channel, one of the numerous streams into which the Yukon river divides on its delta, without serious delay. Low bluffs then enclosed the muddy waters on either hand, and from the top of the pilot house we could see far out over the intensely green surface of the great marsh through which we were sailing.

Slowly our little steamer struggled against the current, and at length passed the entrance of the highest of the distributaries through which the mighty river discharges its waters. The head of the delta is a hundred miles from the sea; the distance about its seaward margin is about 70 miles. Enclosed by the low swampy lands, made largely of river silt, are uplands of older date standing like islands in the sea of grass and moss.

For some two or three hundred miles above the head of its delta, the river spreads out between low shores, and in places is many miles broad; so wide, in fact, that an observer standing on the bluffs forming its right bank, cannot distinguish the land to the south. It seems like a sea of yellow water, but the current even in the broadest part is so strong that its true character is unmistakable. The Yukon throughout nearly its entire length is a muddy, silt-laden stream.

Stops of a few hours were made at the principal native villages, and many were the picturesque scenes that awaited us as we went ashore, and visited the fur-clad people in their homes. For a distance of 150 miles from Bering Sea the people are Eskimos, and live in comparatively well-built houses, usually situated in the shelter of some projecting headland, where fish are abundant. Food is obtained mainly from the river. Large racks filled with drying salmon sometimes gave a pink tint to the village sites before the individual houses could be distinguished.

Many of the houses were literally filled from floor to roof, with salmon hung on poles with bark troughs below to catch the dripping oil. A fire smouldering on the floor in the centre of each house, filled it with dense smoke which finally escaped through a hole in the roof. Our visits to these houses necessitated that we should crawl in on our hands and knees, beneath the mass of drying salmon, in order to reach the small open space in the centre where the people crowded about the fire. The density of the atmosphere and the indescribable odor of these combined dwelling and smoke houses usually made our visits as brief as courtesy would allow.

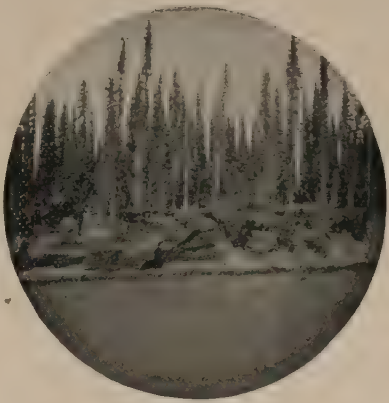
A call was made at the Catholic Mission near Andreieffski, in charge of Sisters whose previous home was near Quebec. The log house in which the Sisters lived had one room fitted up as a chapel, with a shrine made by a carpenter Brother. The home of these devout women was the only oasis of cleanliness that I found in Central Alaska. The largest and most interesting villages on the lower Yukon are Anvik, Nulato and Nukulukahyet, at each of which we remained for a few hours, and learned something of the people and of their country. Soon after leaving Nukulukahyet, near where the Tananah river joins the Yukon from the south, we awoke one morning and found our little steamer struggling with the strong current where the river passes between bold bluffs known as the Lower Ramparts. For an hour or more no perceptible advance was made, and at times the little boat was carried slowly down stream in spite of its quick puffing and the cloud of spray thrown up by the large paddle-wheel at the stern. As a last resort, a heavy wrench was hung on the safety valve, in disregard of all regulations of steamboat inspectors, and sufficient steam pressure obtained to enable the brave little craft to ascend the swift water and gain the broad quiet reach of the river above.

The banks of the Yukon are forested, except on the delta. In the Alaskan portion of its course the forests are dense, with thick undergrowth, but nearer its head waters the uplands are without trees and covered with luxuriant grasses. The prevailing trees are white spruce, growing in closely packed ranks, and seldom attaining large size. Aspens and willows flourish near the streams and, as autumn approaches, form a fringe of yellow along their banks. When looking down on the forest from some commanding station, the avenues of yellow outlined in the tree tops were frequently the only means of judging of the positions of the streams flowing beneath.

YUKON RIVER NEAR THE LOWER RAMPARTS.

Many landings were made for the purpose of obtaining wood for engine fires. As trees had to be felled and cut into the required length, these delays caused a serious loss of time, but afforded opportunities for seeing something of the adjacent country. The halts for wood, however, were usually made at night when the light was too uncertain to admit of safe navigation, but sufficient, especially if increased by a blazing fire, to allow the wood-choppers to work. The night scenes when a dozen swarthy Eskimos, stripped to the waist, wielded their axes in the shadows of the dense forest, while the *Yukon* was tied to the neighboring bank, were always attractive, and rendered the tedious delays much more endurable than if there had been no activity to enliven the scene.

Throughout the length of the Yukon, one is frequently reminded of the high latitude of the region drained by the great river, by seeing strata of ice in the recently cut banks, beneath the dense layer of moss and roots forming the surface on which the forests grow. One may frequently find ice even on a hot summer's day, by scraping away the moss at his feet. In some instances the frozen layer has been penetrated to the depth of twenty-five feet, but its full depth has never been ascertained. In the banks of some of the streams to the north of the lower Yukon, strata of ice over a hundred feet thick have been observed, and the indications are that its total depth is considerably greater than the portion exposed. This sub-soil ice is stagnant, and without the characteristics of glaciers. It is thought by some observers, to be an inheritance from a former period of extreme cold; but under existing climatic conditions, when ice forms beneath a layer of moss, it is preserved during the short summer, and may increase as it does on the tundras, to an astonishing thickness.



SUB-SOIL ICE ON THE BANK OF THE YUKON.

The Yukon is covered with a thick layer of ice during the winter and in the spring thawing begins and the river "breaks up," as it is termed, on its head waters while winter still chains its lower portion. The result is that ice dams are formed and immense floods occur. The swollen waters, freighted with ice, submerge the adjacent flat lands and islands, and cut down the trees that cover them. In many places we found the trees either cut off at a general level of a few feet above the ground, or battered and worn by the ice that had pounded against them. Fragments of floating ice, frequently freighted with gravel and even with boulders three or four feet in diameter, are left on the sand flats when the flood subsides, and on melting deposit their loads in confused piles. In some instances, intersecting ridges, composed of sand and gravel that had been washed into cracks between large ice cakes, form a pattern on the shore resembling Hebrew letters. A person not familiar with the origin of their strikingly symmetrical figures, might easily fancy that they were of artificial origin, and intended to convey meaning.

During the short hot summer, in Central Alaska, when the sun scarcely descends below the horizon, insect life is abundant and mosquitoes and flies make miserable the lives of both men and beasts. When venturing into the forests we wore netting over our heads and gloves on our hands, but even then suffered from the relentless attacks of the millions of insects that swarmed on every hand. When my companions were concealed from me by dense vegetation, I could frequently locate their position by the cloud of mosquitoes that hovered over them and accompanied all of their movements. So vicious and untiring are these pests of the air that life could not be long maintained if one was not well protected from their attacks. Wild animals are sometimes worried to death by the countless hosts of winged things.

On nearing the site of old Fort Yukon, just above where Porcupine river joins the main stream, we passed to the north of the Arctic circle, but instead of experiencing Arctic severity of climate, suffered from the intense heat. The temperature in the shade was at times above a hundred degrees of the Fahrenheit scale. There was scarcely any relief from the heat at night, for the reason that practically there was no night, but only a prolonged twilight connecting the discomforts of one day with those of the succeeding day.

At the site of old Fort Yukon, of which the ruin of a chimney is now the only conspicuous object, Mr. McGrath and his party disembarked, for the purpose of making magnetic observations and beginning a survey of the Yukon river, while the steamer ascended the Porcupine with Mr. Turner's party.

The side trip up Porcupine river was wholly in Arctic lands. After ascending the tortuous stream for perhaps fifty miles, we emerged from the low forested tract, characteristic of the country along the middle course of the Yukon, and entered a hilly region where bold uplands covered with luxurious grass intervened between the forest-bordered streams. Dark spruce forests and groves of cottonwood and willows fringed the river banks and extended in narrow lines up each depression among the hills. On climbing some of the grass-covered summits rising a few hundred feet above the river, I obtained wide reaching views of the rolling uplands, bordering the winding river valley. Hills succeeded hills as far as the eye could reach. To the northwest suggestions of mountains could be distinguished through the hazy atmosphere. The aspens in the lowlands just changing to yellow-green, told that the charms of the northern summer would soon be blotted out, but the subdued and mildly diversified landscape held naught else that suggested Arctic severity. It needed but a farm house or two with pasturing cattle in the grassy meadows, to transform the remote uninhabited land into a picture of New England.

The Porcupine, like most of the tributaries of the Yukon from the north, is a swift, clear stream, with many windings. In its upper course it flows between bold hills with but little flat land along its shores. Our little steamer, the first that ever ventured on its waters, struggled against the rapid current for ten days, when the water became too shallow to admit of farther advance.

Observations for longitude showed that we were still several miles west of the 141 meridian, which treaties have decided shall be the eastern boundary of Alaska. When the *Yukon* could proceed no further, the surveying party transferred its goods to a camp on shore, and the steamer on which I was the only remaining passenger began her swift voyage down the river. On returning to Fort Yukon, Mr. McGrath and his party took up their previous quarters on the steamer, and the journey up the Yukon river was resumed. On reaching the locality where the boundary was supposed from previous observations to cross the river, a landing was made and the boat returned to Fort Yukon for supplies that had been left there temporarily. This delay enabled me to spend a number of pleasant days at Camp Davidson, as Mr. McGrath's station was named, and to explore some of the adjacent country.

Camp Davidson had been previously occupied by a surveying party sent by the Canadian government, who built a commodious log house, in which they passed a winter. The house was still in good repair, and was at once cleared out and enlarged. An observatory of logs, built over the stump of a large tree which served for an instrument pier, was also found standing and was at once fitted up for use.

Over the large Russian stove built of stones, in the cabin, hung a magnificent pair of caribou antlers, which told that game could be expected in the neighboring forest. During my lonely climbs in the adjacent mountains, I found abundant signs of moose and bear, but was not fortunate enough to see large game. The trails of mountain sheep and mountain goats were abundant at elevations of about 3,000 feet. The river was known to abound in salmon at certain seasons, and grayling or Arctic trout, were said to be plentiful. Taking all in all, Camp Davidson seemed to be an excellent place in which to pass an Arctic winter.

When the *Yukon* returned to Camp Davidson, I bade good-bye to my friends, who, as it chanced, remained there for two years, and resumed my voyage up the river.

The struggle of the little steamer against "strong water" was resumed; the monotony being relieved by brief stops at the widely scattered Indian villages. The few natives that we met were a low type of the great Athabaskan family, and lived in wretched villages in which the dogs, used to draw sleds in winter, sometimes outnumbered the people. The vegetation bordering the river is so dense that scarcely a trail has been made through it. The streams are the highways of travel, both summer and winter. The canoes used on the upper Yukon are built of birch bark, with sharp ends, and have a small decking of bark at both prow and stern. Occasionally they are tastefully decorated with beads or colored porcupine quills. They are even more graceful on the water than the canoes with high curved ends, familiar in the waters draining to the St. Lawrence, and so light that a man can easily carry one in a single hand. In deep water a paddle is used, but in ascending streams in shallow water, progress is made by means of two slim poles, one held in each hand of the occupant and pushed against the bottom.

A MINER'S FAMILY ON THE UPPER YUKON.

On our way up the Yukon we called at the mouth of Forty Mile creek, where there are a few log houses and a store. This is the centre of trade for the gold fields on Forty Mile creek and neighboring streams. Gold is found in the gravel along the upper Yukon and many of its branches over a wide area, but owing to the severity of the winters and the high price of provisions, only the richest "washings" have as yet received attention. The miners are a rough, hardy race, made up, it would seem, of representatives of nearly every nation on earth. Some are typical frontiersmen, dressed in buckskin, who are never at home except on the outskirts of civilization. Others were of doubtful character and it is said are seldom known by their rightful names. The remote gulches of the Yukon country seem to offer safe asylums for men who are "wanted" in other districts. Despite the varied character of its inhabitants, this remote community is orderly and but few disturbances have been known. Summary punishment would follow any breach of the public peace. Morality, as understood in more refined communities, is conspicuous by its absence. Many of the miners and traders throughout the length of the Yukon live with Indian women and many are the bright-eyed half-breed children to be seen in the villages. In some instances these unions are legal marriages, but in the majority of cases the Indian mother is deserted after a year or two, when the spirit of adventure leads her companion to other diggings or to fresh hunting grounds.

After leaving the isolated community at Forty Mile we called at the mouth of Stewart river, where there is another trading station, and also at Fort Reliance, which is now abandoned. As the weather was stormy our captain ordered his men to tear down the only remaining house that marked the site of the old post, which figures somewhat conspicuously in the local history of the region. This vandalism was regretted by the hunters and traders who were present, as the house was the only refuge for many scores of miles.

On the first of September, we reached the mouth of Pelly river, opposite the site of old Fort Selkirk. Many names to be seen on the maps of the upper Yukon are records of the western advance of agents of the Hudson Bay Company; in the same way that the unpronounceable names on the lower arms of the same stream indicated the former presence of the Russian American Fur Company.

Fort Selkirk was the highest point that our steamer was to endeavor to reach, and was far beyond the limit of any previous voyage. It is not the head of steamboat navigation, however, as a light-draft boat, provided with good engines, could certainly ascend as far as Miles cañon and probably even beyond. At our last landing, Mr. Harper, a trader, who had been our fellow-traveller, and his Indian wife and several interesting children, went ashore with his large outfit of trading goods, and at once began preparations for establishing a frontier store in the wilderness. The locality chosen was in a dense forest on the right bank of the river, opposite old Fort Selkirk, the chimneys of which are still standing. A more unpromising place, to an inexperienced eye, for a store could scarcely be fancied. For fully a hundred miles before reaching it, we had not seen a human being not connected with the *Yukon*. Prolonged whistles from the boat, the usual signal for calling the natives, were not answered by a single canoe; and after continuing my journey up stream, I saw scarcely a score of Indians before reaching the coast. The forest where the new station was to be established was tangled and moss covered, and the ground elevated only a few feet above the summer stage of the stream. Marks on the trees told that floating ice during spring freshets was piled high on the shore. In spite of these discouraging signs, however, the hardy Scotchman, who by the way, was one of the most genial and best informed men that I met in Central Alaska, went quietly on with his preparations for passing another winter as he had done many previous ones, in the solitude of the wilderness. The inducement that lures traders to such remote localities is, of course, the rich furs, at present, with the exception of gold, the sole export of the Yukon region. Beaver, otter, foxes, mink, martin, wolverine, bear, wolves, etc., are more or less plentiful throughout the entire water shed of the Yukon. The skins of these animals are purchased from the Indians, with flour, cotton cloth, tea, and other articles used in domestic life. To the credit of the traders engaged in this occupation, it may be said that they seldom offer the natives "fire water" in exchange for furs.

On reaching Harper's station, I made arrangements with four miners, who had taken passage on the *Yukon* at Forty Mile, to continue on up the river in their company. The most interesting portion of my trip now began. The open boat built by the miners when they began the descent of the Yukon some eighteen months previously, was repaired and the seams covered with pitch gathered from neighboring spruce trees. Supplies were purchased from Mr. Harper, and the long and difficult journey of several hundred miles against strong currents began.

MINERS ASCENDING THE UPPER YUKON.

Each of my companions was provided with a strong pole, about ten feet long, furnished with a spike at one end. Armed with these, two of the men took their stations in the prow of the boat and two in the stern, and by pushing with the poles on the bottom or against the river bank, the boat was forced along. In this mode of navigation the most experienced polemen occupy the ends of the boat and guide its course. To handle a boat in this manner requires even more skill than when oars are used. Especially is this true, when rounding headlands about which the current is swift. Sometimes when with great labor we had succeeded in nearly passing a beetling cliff, the rear poleman would be unable to turn the prow towards the bank by forcing his end of the boat out from the shore, and the strong current would immediately sweep us out into mid-stream, where the water was too deep for the poles to reach bottom, and we would be carried far down the river before the rude oars could be brought into play. When swept away from the bank in this manner, we would row across to the opposite shore, usually the concave side of a sharp curve, where eddies tending up stream were to be expected and in the shelter of the next projecting headland regain the space that had been lost.

When the character of the shore would permit, a towing line would be fastened to the side of the boat and the four men would "track" along the bank, while I remained in the boat and guided her course with one of the poles. In this manner we could frequently make better progress than by poling, but, unfortunately, the vegetation overhanging the banks was usually too dense to admit of tracking for any considerable distance.

At noon we rested and cooked a dinner over a small fire, and at night, encamped beneath the shelter of the trees, usually at the lower end of an island, and slept in our blankets on the thick moss, without the protection of a tent. When the weather was stormy, the sail of the boat would be stretched on poles so as to form a "lean-to" and a large fire built in front. With the advance of the season the nights became cold, but this was favorable to us, as the mosquitoes ceased their ravages and allowed us to fully enjoy the beauties of the rugged land through which we were voyaging.

At three localities, viz.: Five Finger rapids, Miles cañon, and at the foot of Lake Lindeman, we were obliged to remove all of our things from the boat and make a portage. At the first-named locality our "outfit" had to be carried over a bold, rocky promontory, while the boat was taken around the point against the surging waters by means of ropes. At Miles cañon the boat itself had to be taken out of the water and carried overland for about a mile. This was the most laborious portion of the journey, but fortunately, we had then been joined by two other parties of miners, numbering six men in all, bound in the same direction as ourselves. By uniting our forces the labor of portaging was lightened for all.

As we neared the end of our journey we entered a region formerly covered by glaciers, and, as is usual where ice sheets have recently departed, found the scenery diversified by beautiful lakes. By means of sail and oars we passed through Lake Lebarge, Lake

Marsh, named in honor of the distinguished professor of palæontology at Yale, Lake Tagish and Lake Lindeman. This portion of the journey was especially enjoyable, as a rest was afforded from the extreme fatigue of forcing our way against the tireless current of the river. The shores of the lakes were gorgeous with autumn foliage, and the air cool and bracing. A few natives were met with in this portion of the route, and although sullen and far less friendly than the inhabitants of the villages farther down the river, they gave us no trouble, but added a touch of life to the wild scenery.

As we neared the head of the river the hills became bolder and more rugged, and glimpses could be had of snow-clad mountains to the southward, across which we must pass before reaching the outskirts of civilization. The prevailing mild and dry summer weather of the interior gave place to clouds and rain. Awakening one morning in a camp beneath spreading spruce trees, on the shore of Lake Tagish, we found our blankets weighted down with snow and the entire landscape white as in mid-winter.

In making the short passage between Lakes Tagish and Lindeman, we suffered the only serious accident of the entire trip. One of the boats was capsized in the swift torrent, and swept against a huge rock with such force that it was crushed and its contents lost. The end of our journey by river was near at hand, however, and the accident did not cause delay.

On reaching Lake Lindeman an hour of hard rowing against a squall from the mountains, and our boat grated on the gravelly beach at the head of the lake, and our boat trip was ended. The country about Lake Lindeman is forested, but the trees are mostly small, and the upper limit of arboreal vegetation on the "timber line" can be seen on the mountains to the south at an elevation of perhaps a thousand feet above the lake's surface. There were no signs of human habitation about the lake. The smoke of our camp fire was the only evidence of life in the wild, dreary landscape. Our boats were taken out of the water and cached in neighboring thickets, together with many articles that could not be carried over the mountains. Although our long journey was nearly ended, so far as measurements in miles was concerned, we had still a difficult and but imperfectly known mountain pass to cross, on which the snows of winter had already begun to accumulate.

At Lake Lebarge we met a single miner who had just crossed the pass to the south, and was on his way to Forty Mile, to try his chances in the alluring gold fields. This fortunate meeting enabled us to purchase a few much-needed supplies, and also to obtain assistance on the first march up the mountains towards Chilkat pass.

On gaining the highest available clump of balsam trees, we cleared away the snow, then about ten inches deep and still falling, and made preparations for passing the night. We were without anything resembling a tent, so that "going into camp" consisted in building a fire and finding a somewhat sheltered place in which to sleep. I selected a thick low-branching balsam for my house. The lower limbs were cut away and served for a sub-stratum for my bed, while the higher branches retained much of the falling snow. I slept soundly, and on awakening next morning found my bed deeply covered with snow. My blankets had served me on many expeditions for over ten consecutive years, but in spite of some sentiment for them, I was obliged to leave them in this the last of many camps where they had sheltered me.

With a cup of tea and short ration of frying-pan bread and fried bacon for breakfast, each man took a light load of articles that to him seemed most valuable, and we started in single file for the pass. To most of my readers, I fancy, that party of eleven men tramping through the snow, each with a pack on his back and a rude staff in his hand, and dressed in varied costumes that had seen months if not years of hard service, would have appeared as wild and pioneer-like as could well be imagined. The weather was cold and stormy. A chilling wind swept down from the icy mountains, of which only occasional glimpses could be seen through the dense clouds covering their summits. Snow fell from time to time, but between the fierce squalls the sun shone out bright and clear, and revealed fleeting pictures of the rugged land below us to the north. Our course led upward over glaciated rocks, and across snow-filled valleys, toward the dense cloud banks that veiled all beyond.

My companions had crossed the pass on entering the Yukon country, but only one of them had even approached it in the direction we were now travelling, and none of them seemed confident of finding the way when the mountains were cloud covered. After many weary hours of tramping over the roughest of country, where only traces of a trail could occasionally be had through the freshly fallen snow, we gained the base of the heavy cloud banks concealing the mountains. In deep gorges leading upward between neighboring peaks we could see blue glaciers, looking like frozen cataracts descending from unseen regions beyond. In the obscurity of the clouds that enveloped us all was dark and uncertain. Every vestige of a trail had disappeared, and no one knew which of the black gulches about us would lead to the trail on the other side of the pass. While consulting as to the best plan to follow, some counselling a return to our blankets, where rations sufficient to maintain us for a day or two had been left, I noticed a flock of geese approaching from the north bound on their autumn navigations. They were flying low, just beneath the base of the outward-reaching clouds, and I fancied would choose the lowest gap in the mountains for their passage. In this I was not mistaken, although my companions, not aware, perhaps, that geese once saved Rome, refused to follow the lead of a guide they considered so stupid. After two or three vain trials we again found signs of a trail, and were soon in a narrow gorge with towering peaks on either hand, the summits of which were lost to view in the clouds. After crossing the névé of a small glacier so completely shrouded in mist that but little of its character could be seen, we travelled on over smooth bare rocks, and were rejoiced to find that the next stream we reached was flowing southward, and that we had actually crossed the divide between the waters of the Yukon and the streams flowing to Lynn canal. Descending rapidly, along an exceedingly rugged trail, we were soon below the clouds, and a drizzling rain reminded us that we were on the Pacific slope, where days of clear weather are few. As night approached we gained the upper limit of vegetation. Another hour of hard tramping brought us to a dense growth of hemlocks, sheltered in a wild gorge through which a roaring torrent was plunging down to join other similar streams below. Selecting an aged evergreen, whose wide branches reaching far out from the moss-covered trunk touched the ground, we placed our packs beneath it, and cutting a dead tree that stood near, soon had a blazing fire in front of our retreat. Without tents or blankets, and with only a little bread that we carried in our pockets, and a drink of tea for supper, we lay down on the thick, water-soaked moss, each man with his head toward the tree that sheltered us and his feet toward the semicircle of fire, and slept. During the night, as one or another of the party awoke from his uncomfortable slumbers, he would replenish the fire, and, perhaps, stand in front of the cheerful blaze until his benumbed limbs were warmed before joining his slumbering companions.

Of all the wild pictures of camp-life that linger in my memory, there are none more striking than our bivouac beneath the dark hemlocks of Taya valley. My companions, rough and uncouth as men could well be, had been absent from civilization at least a year and a half, and some of them for three years. Their hair and beards had grown long, and their faces were tanned and weather-beaten by constant exposure. Their garments, then in the last stages of serviceability, had been made by those who wore them, from any material that chanced to be available, from buckskin and fur to flour-sacks, and had been repaired without regard to color or texture. Lying in many positions beneath dripping boughs, with the fire light streaming over them and gleaming on the falling rain drops, they made a picture of frontier life as wild and picturesque as could well be fancied. One not accustomed to the vicissitudes of exploration, coming suddenly on such a scene, would certainly believe he had stumbled on a band of the most desperate outlaws.

When the morning dawned and one after another of the moss-grown trees about us became visible through the white mist, we ate a hasty breakfast, even more frugal than the supper of the previous evening, since only remnants of the former meal remained, and resumed our march. Forcing our way through the wet vegetation we were drenched to the skin, but this was of little moment, since the stream we were following swung from side to side of the valley, and had to be forded many times. The crossing of a rushing torrent of ice-cold water from two to four feet deep is by no means a pleasant experience, neither is it unattended by danger, as was testified by the grave of at least one man, who had been drowned in making the attempt.

There are two ways employed by frontiersmen in crossing dangerous streams when ropes are not to be had. One is for each man to provide himself with a stout stick, answering to an alpenstock, and for all of the men who are to cross, to hold their sticks horizontally before them with their ends overlapping and tightly grasped, thus making practically one continuous pole. The party then enters the stream abreast, and wades slowly across, the tallest and strongest man being placed at the upper end of the line, where the greatest force of the water is experienced. The second plan is to overlap alpenstocks as before, but to enter the water in single file, at right angles to the current; in this way a part of the men are on firm ground in shallow water, and can assist those struggling against the swifter portions of the current.

During our last march we had to cross Taya river some eight or ten times in the manner described above, and for once experience did not breed contempt. Benumbed by the cold, each fresh plunge into the icy waters seemed more trying than the one that preceded it. At last, however, when fatigue and lack of food had begun to tell on our strength, we saw before us the welcome sight of a chimney rising above the foliage, and in a few moments gained Chilkat village, and found food and rest at the trading post kept by Mr. Haley and his kind-hearted wife.

My companions left the next day or the day following in boats bound down Lynn canal, for the town of Juneau, but I remained a few days for rest and with the aim of seeing something of the mountains and glaciers, for which Lynn canal is justly famed.

A day of brilliant weather, during which I climbed a neighboring mountain peak, more than repaid for the delay. At an elevation of 3,000 feet I crossed the névé of a small glacier and obtained an unobstructed view of the magnificent ice-crowned mountains in which the ancient river valley, now occupied by ocean waters and known as Lynn canal, was carved. From one locality I counted forty glaciers, some of them several miles in length, and a change of position brought still others into view. The outlines of vast amphitheatres could be traced by lines of crags and rock-pinnacles, but the great depressions themselves were filled to overflowing with ice.

On the sides of Taiya valley the upper limit of timber growth or the "timber line," is sharply drawn at an elevation of about 2,500 feet. Above that height the mountains are stern and rugged, while below there is a dense forest of aged hemlocks, festooned with moss. On the day that I looked down into this seemingly enchanted valley the air was clear and sunny in the upper regions, but the great gulf below was filled with drifting vapor. At one moment nothing would be visible but the sombre forest, through which the white vapor was hurrying; and the next, the veil would be swept aside, revealing the mountain spires, snow pinnacles and torquoise-tinted cliffs of ice towering heavenward. These rapidly changing pictures, seen through cloud rifts, seemed glimpses of another world.

Space will not permit me to detain the reader longer. Returning from the mountains I resumed my journey. With a single Indian I made a canoe trip down Lynn canal, a distance of over 100 miles, to the little mining town of Juneau, and from there returned to Puget Sound by steamer.*

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* Some account of observations on the geography and surface geology of Alaska, made during the journey described above, may be found in the Bulletin of the Geological Society of America, Vol. 1, 1890, pp. 99–162.

THE COMPOSITE ORIGIN OF TOPOGRAPHIC FORMS.

BY

ALBERT PERRY BRIGHAM.

The genetic method cannot be neglected by the modern geographer. Topographic form is sure to raise the question of origin. The analysis and classification of such forms can scarcely proceed on any other basis, as even casual reference to the literature of the subject will show.* With the untrained, but interested observer, as well as with the scholarly student of nature, the first question is,—how? Every form is dependent on material and structure and is the resultant of a group of forces acting conjointly or in close succession, and in varying proportion of efficiency. Every teacher finds increasing difficulty in referring forms truthfully to the agents that moulded them. He is aware that he supplies the beginner with a crude classification which will be modified as the student becomes able to grasp the complex history of the form under consideration. Wider observation will always supply a graded series incapable of hard and fast grouping. The genetic series is comparable to those of the organic kingdom, and Darwin's remark on the increasing difficulties of the young naturalist as he surveys increasing numbers of related specimens is equally pertinent here. The interdependence also, of biologic groups, in the struggle for existence, finds a close parallel in the geographic field.

There is, at the present time, increasing recognition of certain form-making agents which have not heretofore received due attention. Eolic geology is one of these little tilled fields. Le Conte's larger work dismisses the subject with less than a page. The formation of dunes and the effectiveness of the natural sand-blast, in certain situations, comprise nearly the whole body of published fact until quite recently. Yet the total of wind action in transporting material and in completing the sum of topographic expression cannot be otherwise than very great. At the late Baltimore meeting of the Geological Society of America Mr. G. K. Gilbert presented a paper on the Formation of Lake-basins by Wind, in the arid regions of the West. Mr. J. B. Woodworth has recently published a useful discussion of wind work in New England,* and Mr. J. A. Udden has set forth the laws of the erosive and transporting work of the atmosphere.† The co-operation of the atmosphere with water in the constructive and destructive movements of waves, also, has been taken for granted rather than recognized at its true value. It is not too much to say that the structure and surface of all terranes, ancient and modern, have been affected by eolian action.

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* See as examples, The Classification of Lake Basins, W. M. Davis, Proc. Boston Soc. Nat. Hist., Vol. XXI, 1882; also, Proposed Genetic Classification of Pleistocene Glacial Formations, T. C. Chamberlin, Jour. Geol., Vol. II, pp. 517–538, July–Aug., 1894.

Anthropic geology has not fared much better, though Professor Marsh's Man and Nature marks a somewhat early attempt in the right direction. It seems safe to say that, by deforesting and by tillage, man has doubled the rate of surface degradation over large tracts of country. By his means, gravity, the winds, atmospheric erosion and the mechanical work of rain and streams have been multiplied in effectiveness, as is witnessed by streams which run full loaded after each shower, whereas before man's occupancy of the field their crystal clearness was rarely dimmed. That man is the central theme in geographic study would scarcely fail of recognition by any, but that he is an actual maker of topography probably occurs to few who are not students of earth forms. Even such would fail of the truth, if they are accustomed to view such forms as dead, or as apart from a constant and most complex historical development.

The principle of composite agency applies to continental evolution in general. The building and uplifting processes unite with the down-wearing processes. Constructive work is accompanied by degradational activity in ever shifting proportion. Thus the making and distribution of sediments involves the nature and extent of previous land surfaces, the plan of their drainage systems, the character of the sea floor, the direction and power of winds, currents and tides. The nature of the sediments, rapidity of accumulation and other conditions, regulate consolidation. The rate and character of the force which turns this sea bottom into a land surface is then to be considered, and vulcanism may enter at any time to vary the assemblage of material and add new elements of structure to the mass. We will suppose the above network of agencies to have been operative, with a resulting land surface of average continental relief. The forces which must already have begun the process of base-levelling will be followed up in certain directions in illustration of our theme. The history of a cycle of base-levelling is the joint product of structure and erosion. But as structure is a composite affair, so general erosion is accomplished by many agencies, and is accompanied by many episodical constructional processes and forms.

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* Post-glacial Eolian Action in Southern New England, Am. Jour. Sci., Vol. XLVII, pp. 63–71, Jan., 1894.

† Erosion, Transportation and Sedimentation Performed by the Atmosphere, Jour. Geol., Vol. II, pp. 318–331, Apr.–May, 1894.

The distinction between hard and soft, or better, between rocks more and less destructible by erosive agencies, finds illustration in all topography. Thus Geikie says:* "This relation between relative destructibility and external configuration is traceable in every part of Scotland, and indeed may be regarded as the law that has mainly determined the present topography of the country." The author describes the marked contrast between areas of ancient sandstones forming terraced cones or pyramids, and the yet more ancient gneisses, wrought into a "tumbled sea," by a compound of weathering, sea action and glacial grinding. The topographic resultants of variant horizontal beds may perhaps be best studied in Western America. Dutton's Tertiary History of the Grand Cañon District is little else than an amplification of this theme, and to this may be added every illustration of Bad-Land topography in our official surveys of the West. Hardly less instructive are our more modest, and often glacially modified or obscured "escarpments," in regions of horizontal sediments in the East. Gilbert has shown how the rapid erosion of the upper member of a topographic series, will modify the conditions for all lower members, in a given drainage basin: "As any member of the system may influence all the others, so each member is influenced by every other."† This well emphasizes the difficulty of adequately stating all the conditions of even the simplest topographic problem. The variant characters of igneous rocks and their relations to inclosing, or subjacent sediments, show beautifully the topographic importance of rock characters. Thus we may compare the rhyolitic tables and mesa caps of Colorado with the rugged needle-shaped peaks of the San Juan, hewn from vast sheets of andesitic lava, or we may put over against these the characteristic granitic domes of the Platte Valley in the same State. Geikie notes this weathering of granite in his account of the Highland Hills,‡ where he describes it as "a rock which, from its usual decomposing character, and its abundant vertical joints, combines in its decay a grandeur of lofty cliff with a smoothness of mountain top such as none of the other Highland rocks can boast." Becker illustrates the same law in the Sierras of California.* The same writer† notes the topographic effects of horizontal lava capping. If lava sheets be poured out upon a surface, or intercolated between beds of sediment, and the whole mass moderately tilted, we have the conditions presented by the trap sheets of Connecticut and New Jersey. We may compare the structure of Salisbury Crag and Arthur's Seat in Scotland,‡ the former being due to an intrusive sheet, while the latter is a solitary mass or boss. In such cases the topographic result would vary with the relative hardness of the lava and the sediments, the relative thickness of the two, the number of alternations between them, the amount of tilting and the subsequent lapse of time.

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* Scenery of Scotland, p. 108.

† Geology of the Henry Mountains, pp. 123–124.

‡ Scenery of Scotland, p. 199.

The same considerations apply if the entire column is sedimentary. As already noted, the variety of result may be very great, if the beds weather and are dissected in their original, approximately horizontal attitude. If we break them into crust blocks and tilt them, we get a type of mountain and valley illustrated in the Great Basin. If we fold the series we introduce infinite possibilities in topographic history. Some of the factors are: (1) Direction of application of the force, determining the chief lines of mountain and valley, as in the main trends of Scotland and the Appalachians; (2) Ratio of force to resistance of beds, in virtue of their hardness or thickness, thus determining the folds as open or close, reversed or faulted; (3) Rate of application of the force as compared with the sum of erosive energy, determining whether the antecedent drainage system shall survive the change of conditions; (4) Presence or absence of hard beds of good thickness to act as topographic determinants of the main ridges and included valleys.

In such a region of anticlinal and synclinal axes, topographic development and interest centre in the drainage history, as controlled by the above-named dynamic and structural factors. Henceforth amount of seaward slope, climate, and character of beds in detail determine the river history; and the cutting down and broadening of valleys, the reduction of summits and slopes, headwater capture and lateral migration, with transport and incidental new constructional forms of the "waste of the land," are steps in the progress toward ultimate base-level.

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* The structure of a portion of the Sierra Nevada of California, by G. F. Becker, Bull. Geol. Soc. of America, Vol. 2, p. 69.

† Op. Cit., p. 66.

‡ Scenery of Scotland, pp. 333 and 356, and folding geological map with sections at close of volume.

Powerful as structural factors are, it is important to recognize the limits of their efficiency. By submergence, sedimentation and recovery, a new drainage system may be superimposed upon an old one, with disregard of the old structural and erosion features, at least until the work is again far advanced. In warm and moist climates topography is probably less dependent upon structure. Greater altitude with its attendant conditions may overrule structure, as in the striking case described by Gilbert in the Henry Mountains,* where Mount Ellen, altitude 11,250 feet, has a smooth crest and even slopes, and Mount Holmes, altitude 7,775 feet, is ribbed with ragged dikes, etched into high relief. The difference is due to the moisture and vegetation of the higher altitudes.

As has been elaborated by Davis and others, a normal cycle of geographic development may be interrupted by oscillatory movements of a decided character. If the movement be downward, erosive work is retarded and the area will exhibit a system of fiords about its seaward margin; or, if base-level had been approximated, it is conceivable that the resulting peneplain might be carried beneath the sea, or so nearly that the waves would complete the work by forming a plain of marine denudation. If the movement were an upward one, the base-levelling forces would increase in energy as a greater task was given them, and if a peneplain had been formed, it would become an elevated plateau subject to vigorous erosive dissection. From this dissection a secondary base-level of part of the region concerned, would in time result. This might go on until the entire plateau were destroyed, or another uplift might ensue, carrying up the second base-level some hundreds of feet above the sea, and at the same time lifting the remnants of the original peneplain correspondingly higher. This is the actual history of the Southern Appalachians since Cretaceous time.† Such a history would probably be always complicated by many minor oscillations, and by varying degrees of oscillation, producing deformation in parts of a given area. To sum up these remarks on the base-levelling process in general, we may say that the finest illustration of our thesis is the rare completion of base-level, or the critical balance between uplift and denudation, each checking the other, marked upheaval occasioning rapid degradation, resulting always in a limit of altitude and medium of climate, favorable to organic life.

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* Geology of the Henry Mountains, pp. 117–120.

† See Geomorphology of the Southern Appalachians, by Willard Hayes and Marius R. Campbell, Nat. Geog. Mag., Vol. VI, pp. 63–126.

I propose now to review certain special classes of topographic forms from the point of view of their composite origin. These forms have already been called episodical, as related to the general history of the land.

Probably no better illustration of our principle exists, than the fresh-water deposits of the ice time. Here would be noted especially the topographic individuals known in current terminology as kames, eskers, frontal aprons, fossil deltas or sand plains, valley trains, and beaches and bottoms of glacial lakes. These are water deposits, but due to water complicated with effects of ice mass and movement, and pre-existing topography. The study of earth forms has few passages of greater interest than the early attempts of geologists to deal with kames. Kames is a Scotch term applied to assemblages of short, conical, often steep hills, built of stratified materials and interlocking and blending in the most diversified manner. They offer a group of features which can but strike attention, but whose mode of origin has as yet no place in the common teaching of Physical Geography. They rarely fail of being opened, for the hauling of sand and gravel, or for purposes of interment, and are always and truthfully ascribed to water action, but they are imperfectly seen, the imagination is not exercised, the reason is left unsatisfied, and their educational value is lost, because their composite history is rarely known, and therefore is not taught, save in the higher grades of instruction. One of the earliest allusions to these hills as forming a district class, is found in the Geology of New York.* Of greater interest, as grappling with the problem of origin, is a passage in Hitchcock's Report on the Geology of Massachusetts.† "That they were the result of running water, no one who has seen them can doubt . . . . But they occur on a scale so immensely larger than anything now witnessed, that the mind is led to inquire whether they could have resulted simply from running water." Dr. Hitchcock shrewdly adds, a few lines later, "There is another agency which I have often suspected may have been concerned, and that is ice." But the discussion shows that true notions of the conjoint action of water and ice were not, as indeed they could not then be, in the author's thought. And it must be confessed that the study of existing glaciers has yet to proceed considerably, before we can have a clear and satisfying mental picture of the formation of kames.

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* Vanuxem, Geol. 3rd Dist., pp. 218–219.

† Vol. II, pp. 366–370.

The kames afford a further illustration of our main theme. It is sometimes held that they yet preserve their precise constructional form, and that the recency of the ice invasion is proven by their unbroken, flowing contours. That they are not often channelled by erosion is true. But this may be due to want of gathering surface for streams upon their small summits. On general principles one would expect a notable softening of outlines by creep and rain wash, even if these mounds date no farther back than eight or ten thousand years. Illustrations from regions of active glaciation, notably one of Professor I. C. Russell's photographs of morainic kame from the Malaspina glacier, add force to the suggestion. Thus the kame is a very complex product of water acting under glacial conditions, and of subsequent moulding influences.

The same kind of illustration is afforded by the esker, a rectilinear, or curvilinear ridge of discordantly stratified material, being in structure like the kame, but having a topography of its own; also by the fossil delta, or sand plain, described by Davis and others, and dependent upon a group of topographic and other conditions accompanying the retirement of the ice.

Even the moraine, so often thought to be a simple mass of bowlders or bowlder clay, and solely the work of ice, is as good a type as any of composite genesis. Both the constitution and the surface expression of moraines depend on the local lithology and topography, and morainic accumulation must often be said to consist, for the major part, of washed and stratified material. A shoved moraine of true till may be worked over and deposited as kame or esker, without losing all of its finer constituents, and without complete obliteration of the glacial gravings upon its pebbles. On the other hand, a mass of kames may be pushed up into a true shoved moraine, losing its structure, but retaining the coarseness and water-worn character of its fragments. Many of the gravel beaches of the New England coast are fed from drumlins or other masses of till, giving us shore deposits of glacio-marine origin.

Glaciation as a whole is a vastly important geographic agent, and its results are curiously interwoven with conditions of pre-existing topography and post-glacial activity. The same principle is strongly suggested in the causal field of glacial geology. Few geologists would, I suppose, give in their adhesion to a purely astronomic cause, and equally few would care to deny that celestial changes may have had some efficiency. If, on the other hand, a majority incline to geographic causes, the field for complex action is narrowed, but hardly simplified. We may indeed, with some freedom, assert the complexity and consequent difficulty of all great world-shaping forces. It is the same whether we study glaciers, volcanoes, earthquakes,* or the continents.†

The co-operation of other agencies with streams in valley making is an important illustration of the general principle with which we are dealing. In the earlier days of geology, when valleys were attributed to every agent but the streams which were at work in them, it was natural that the advocates of the new doctrine should exaggerate the efficiency of the stream. This inadequate view has not, at least until recent years, been suitably qualified by attention to other agencies, such as are covered by the broad term weathering.‡ The best illustrations of this truth are found in the talus slopes, bordering the base of cliffs, awaiting the river's first service, not abrasion, but transportation; and further, in the fact that river valleys are often narrow in hard rocks and wide in soft rocks, as is true of the Hudson of the Highlands compared with the Hudson of the Catskill region.§

The structures, to which we may apply in its broadest sense the term terrace, afford a good illustration of our principle, whether we note the variety of causes which may introduce horizontal elements into the landscape, or consider the network of agencies to which a single sort of these structures is often due. Thus we may have the terraces described by Chamberlin as morainic,‖ formed on the flanks of ice tongues, graduating at one end into the moraine, and becoming a smooth bench at the other. Other benches are due to glacial fluting and appear as rock shelves more or less mantled with unconsolidated material. They range in all degrees of variation, from approximately horizontal to the typical drumlinoid curve, and when of the former sort may closely simulate benches of diverse origin.

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* See Report on the Charleston Earthquake, C. E. Dutton, 9th An. Rep. U. S. Geol. Surv., p. 211.

† Continental Problems, Presidential Address by G. K. Gilbert, see Bull. Geol. Soc. of America, Vol. 4, pp. 179–190.

‡ See "The Geological Dates of Origin of Certain Topographic Forms on the Atlantic Slope of the United States," Bull. Geol. Soc. of America, Vol. 2, p. 579; also a passage by the writer, "Rivers and the Evolution of Geographic Forms," Bull. Am. Geog. Soc., Mar., 1892, pp. 6–8.

§ W. M. Davis, Bull. Geol. Soc. of America, Vol. 2, pp. 570–571.

‖ Term. Mor. Sec. Gl. Ep., 3rd An. Rep. U. S. Geol. Surv., p. 304.

We have also to note again in this connection the differential weathering of undisturbed sedimentary beds of varying hardness, giving rise to rock platforms and associated escarpments of varying height, according to the thickness of the beds or the frequency of their alternation. Geikie describes comparable structures etched from lava beds of "variable destructibility" in the Isle of Eigg* and in Skye. These are further illustrations of the importance of general weathering in the genesis of our geography. It is probable that many benches are a composite of differential weathering and glacial fluting, the character of the platform depending on the relative importance of the two, and upon the more general features of the pre-glacial topography. If weathering were extensive and glacial action moderate, we should probably find broad benches, approximating the horizontal attitude. If glacial action were in excess, the resemblance to the terrace would be lost in the approach to the drumlin contour.

Marine and lacustrine action give origin to other horizontal platforms. If these are in close association with the ocean, they are readily referred to their cause. If, however, they are far inland and do not afford marine fossils, their interpretation is less simple. Thus, Professor Spencer holds as marine many high level beaches about the Laurentian basin which the majority of observers connect with glacial lakes. In all cases of lacustrine and marine platforms the type varies with the topography, the character of the materials carved out and transported, and the direction of prevailing winds as compared with the trend of the shore lines. According to situation, we shall have "wave-cut," or destructive beaches, or wave-built,—constructive beaches. In the case of inland beaches suspected to be of marine origin, the detrital platform may be either truly marine, or estuarine, the decision resting both upon topographic relations and upon the nature of the fossils. In the case of the lake, the beaches may have been more or less isolated from bodies of water by desiccation, as in the case of Lake Bonneville; by retirement of ice barriers, as most hold regarding Lake Agassiz and Lake Iroquois; or by sedimentation and drainage, as is true of vast numbers of the smaller extinct lakes.†

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* Scenery of Scotland, pp. 217–218.

† For a full discussion of Lake Beaches, see Topography of Lake Shores, G. K. Gilbert, 5th An. Rep. U. S. Geol. Surv., pp. 69–123; or, Lake Bonneville, Monograph I, U. S. Geol. Surv., pp. 23–89.

If we turn to river terraces, the complication of causes and resulting structures is quite as noteworthy. At the outset we have to note two classes, in which results differ according to the material in which a river works. If it be the bed-rock of a region, we have "terraces of planation."* If terraces be carved from loose valley filling, they are then called alluvial terraces. The paper to which reference has just been made, suggests some facts pertinent to our discussion. Thus the writer, alluding to phases of river work in successive geographical cycles, says (p. 258): "Involved terraces, or, as it seems better to call them, complex terraces, are due to a combination of causes acting jointly or in succession, and continuing through the whole or part of one or more geographical cycles. If we could know all the factors that have determined the formation of most of the terraces we see at the present day, I think that we should find them to be better classed as complex terraces than under any other heading in the classification thus far proposed." Upward and downward oscillations controlling the gradient of streams, nearness or remoteness of divides, character of adjacent river basins, changes of climate, involving glaciation or variation in rain-fall, the relation of a river to its tributaries, and the character of the rock-beds upon which it does its work, are all factors of importance in making a given terrace what it is.

A further illustration of complex origin is afforded by lake basins. In a former bulletin of this Society, the writer has discussed the composite genesis of the Finger Lake basins of New York.† The view is taken that the depressions were initiated by preglacial river work, which of itself is a highly composite factor. A portion of the valleys was deepened, within limits largely determined by the character of the local terranes, by glacial action. Dams of greater or less height were then created by fillings of ground moraine, the basins were deepened by recovery from northward continental depression, and the final touches were put upon them by sedimentation, wave erosion of shore cliffs and a small down-cutting of their outlets.

The strenuous holding of opposite views of the making of the Great Lakes affords a presumption, at least, of their composite origin. And it would be rash to deny that river erosion, general weathering, glacial scooping and blockade, warping of the crust, and differences between the various Paleozoic and pre-Paleozoic terranes have all had some important share in the great result. The elaborate nature of the Great Lake problem has been well set forth in a paper by Professor I. C. Russell.* The paper is not intended to embody a theory, but to state the conditions of the problem. I quote a single passage (p. 398) as in point here: "As the case stands at present it appears that there is evidence of a pre-glacial valley or series of valleys as has been claimed by several geologists, and that all but the boldest features of the old topography have been obliterated or greatly modified by glacial erosion followed by glacial and other sedimentation. Additional observations should show somewhat definitely the amount of work assignable to particular portions of the history. How far the results of subaërial and of glacial erosion have been modified by other agencies, more especially by orographic movements, has also to be considered." The late Dr. J. S. Newberry represents the extreme advocacy of the glacial origin of these great features of American geography, while Professor Spencer denies for the most part the efficiency of ice, holding to river erosion, sea invasion and crust movements. We may expect that these and other agents and conditions will be well averaged when the verdict is made up.

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* See Geographical Development of Alluvial River Terraces, by Richard E. Dodge, Proc. Boston Soc. Nat. Hist., Vol. XXVI, p. 258.

† Bull. Am. Geog. Soc., Vol. XXV, No. 2, 1893.

We take, in further illustration of composite origin, the cooperation of agents in certain extensions of continental borders and in developing insular masses. Le Conte's account of the growth of Southern Florida is a good case.† He notes first the formation of a sub-marine bank by the Gulf Stream. Corals then gain a foothold and add their hard framework and more or less comminuted debris to the pile. The coral and other material is then brought by wave action into the aërial zone. A certain amount of land rubbish is also transported from the materials of ordinary erosion on the continent and adjacent islands. The work is completed by the extension of the water-loving mangrove trees and the entanglement of land wash and organisms among their roots.

The Bermuda Islands afford a kindred case. Upon a substructure of some sort is built a cluster of islands whose visible rocks are exclusively limestone. The steps in the constructive process are: growth of organisms, especially corals; comminution and redistribution by the waves; eolian action upon beach sand raising the beds to a maximum height of a little more than 200 feet; the percolation of rain and sea water and consequent solution, cavern making, re-deposition and cementation; weathering and shore abrasion, giving rise to notable sea caves and lofty escarpments. So complicated are the forces which continually shape this island mass, although lithologically it is perfectly homogeneous.

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* Geological History of the Laurentian Basin, in series of "Studies for Students," Jour. Geol., Vol. I, May–June, 1893, pp. 394–410.

† Elements of Geology, p. 160.

Our principle is likewise well seen in the formation of atolls and barrier reefs. If we take Darwin's theory, we have the formation of the support of the coral mass chiefly by vulcanism, the growth of corals with wave and wind action as before, and continued subsidence, as the chief factors. If we take Murray's theory, we have, if possible, a longer list of conspiring causes. The submarine foundation may be one of accidental volcanic elevation to the required height, or a cone truncated by the waves, or a more deeply buried, primitive platform built up by the remains of pelagic organisms. Coral growth, wave and wind action, occur as usual, but with non-growth, and solution at the centre, in room of subsidence, to account for the lagoon. If, as held by some, both theories are true, each holding in certain cases, we find a still more complicated network of agencies, and a still better illustration of our principle.

The formation of coast islands is dependent upon several conditions. They may be constructive, built up as low, off-shore islands, where waves break and drop their load on a slowly descending marginal sea bottom. If wind and consequent wave action are powerful, tracts of the mainland may be insulated by the cutting away of surrounding areas. This is especially true of hard coast rocks bordered by those which are more yielding to mechanical agencies. If the land be undergoing a downward movement, headlands and any eminences adjoining the shore may be surrounded by the transgression of the waves. Insulation by surrounding erosion and by subsidence are likely to proceed together and to have joint efficiency in the production of the island form.

There can be no question of the importance of the considerations here set forth to the geographic investigator. This is true of students who set themselves to an exhaustive review of limited and familiar areas, and is no less true of explorers in fresh or remote fields. We cannot measure the degree to which reports of official explorations and private travel would have been enriched, during even the more recent decades, had the writers been, more often than they were, observers in this true and high sense.

Even more, if possible, may be said of the usefulness of such doctrines in geographic teaching. A recent pedagogical document contains a reference to the land, the water and the air, as the "three dead geographic forms." The writer indeed used the expression in contrast with the biologic groups, but even thus it seems to me peculiarly unhappy and inappropriate, in view of that composite moulding, delicate balance and sensitiveness to change, which characterizes the forms with which geography deals. There can be no more profitable use, or effective stimulus, of the imaginative powers of a youth than the effort to realize vividly the growth of a geographic individual. More and more is this true as the student advances from one form to another, and finally becomes able to combine in panoramic review the elements of the complicated and progressive history of a region.* The teacher of Physiography has no greater reward than is his when a student assures him that henceforth his native State will be to him a new country, or that he shall see the hills and valleys of his old home with new eyes. This is precisely because he has learned to interpret the forms in the light of their origin, to read the work of the frost, the rain and the plant, to measure the achievement of the river, with perception of its past and prophecy of its future, or to see where the glacier has traced its unmistakable inscription. Every journey becomes fraught with meaning, and the traveller who has caught the spirit of modern geography will not report the great plains of Kansas and Nebraska as "uninteresting." It must, however, still be said that many colleges deny their graduates this appreciative eye. But even the secondary and earlier grades cannot much longer deprive their pupils of this best fruit of geographic study.

Colgate University,
January, 1895.

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* For the fullest expositions of geographic development in its pedagogic significance see several papers by Professor W. M. Davis, Geographical Illustrations or Suggestions for Teaching Physical Geography, Based on the Physical Features of Southern New England, Pub. by Harv. Univ.; The Improvement of Geographical Teaching, Nat. Geog. Mag., Vol. V, pp. 68–75; Physical Geography in the University, Jour. Geol., Vol. II, Jan.–Feb., 1894, pp. 66–100. Teachers may also consult with profit, Report of Conference on the Teaching of Geography, accompanying the Report of the Committee of Ten on Secondary School Studies, pub. by the U. S. Bureau of Education.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

THE FRANKLIN CELEBRATION.—It was on the 18th of May, 1845, that Sir John Franklin's Arctic expedition sailed from Greenhithe, never to return.

The fiftieth anniversary of this event was commemorated on the 20th of May, under the auspices of the Royal Geographical Society, by a visit to Greenwich, where the Franklin relics were inspected, and an evening meeting in the theatre of London University. At this meeting Mr. Clements R. Markham, the president, made an address, in which he reviewed the life and career of Franklin, the character of his officers and men, and the work done by his party, which practically discovered the North-West Passage. He spoke of the search expeditions, and recalled the generous action of Mr. Grinnell and the United States Government.

He was followed by Admiral Sir Leopold McClintock, who dwelt upon the lesson of Franklin's example and the admirable steadiness and discipline of his men, and closed with a reference to Lieut. Schwatka's* search for relics in King William's Land.

Including this, the last of all, the expeditions sent out to ascertain the fate of Franklin numbered 40, and it could have formed no part of Mr. Markham's design to present the list of them in his address. Something, however, he must have said as a tribute to the memory of that *hero of Arctic travel*,† Dr. John Rae, who brought back to England in 1854 the first discovered, and not the least precious, of those Arctic relics now preserved in Greenwich Hospital. To speak of a Franklin celebration is to remember, as Mr. Markham must have remembered, the foremost names on the long roll of the search expeditions, and those, who had not the good fortune to be present at the meeting in the theatre of London University, must regret the insufficiency of the reported proceedings.

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* Lieut. Schwatka belonged, not to the navy, as the *Times* has it, but to the army of the United States.

† Obituary notice of Dr. Rae in the Geographical Journal, Vol. 2, p. 275.

SECOND ITALIAN GEOGRAPHICAL CONGRESS.—This Congress will meet in Rome in the latter part of September, 1895. There will be four Sections: the Scientific, embracing Mathematical Geography, Cartography and Physical Geography; the Economico-Commercial; the Didactic; and the Historical, comprising the History of Geography and of Cartography, and Historical Geography.

Membership is open to all on payment of the fee of Ten Lire to the Comitato Ordinatore, Via del Plebiscito, 102, Rome.

M. J. DE REY-PAILHADE, President of the Toulouse Geographical Society, will submit to the Sixth International Geographical Congress the question of the *simultaneous and parallel application of the decimal system to the measurement of time and of angles*, in order to obtain a greater rapidity in calculations with diminution of the chances of error.

The project bears a natural relation to Prof. Penck's proposed map of the world on a scale of $\frac{1}{1000000}$, and it forms the subject of a lucid report to the Toulouse Society by M. de Rey-Pailhade himself.

NORTH AMERICAN POLAR EXPEDITION.—The *Deutsche Rundschau für Geographie und Statistik*, for May, 1895, reports on the authority of a communication received by Prof. E. von Nordenskiöld in Stockholm, that an Arctic expedition is in preparation in North America, under the direction of the *State* Geological Survey, and that the cost of it will be borne by American capitalists, who have furnished for the purpose 500,000 dollars.

The object of the expedition is said to be the exploration of the hitherto unknown archipelago on the northern coast of North America, and, incidentally, of Ellesmere Land, where search has already been made for the lost Björling party. Prof. Dr. Robert Stein, of the Geological Survey, who planned two years ago, but did not succeed in organizing, an exploration of Ellesmere Land and Grinnell Land, has requested the Canadian Arctic traveller Tyrrell to accept the command of the party charged with the search for the members of the Björling expedition.

This report has found its way into the *Scottish Geographical Magazine* for June (p. 315), and it seems proper to say that Mr. Robert Stein has no knowledge of the matter, and that the capitalists, who stand ready to advance half a million dollars, have so far escaped recognition.

TO THE POLE BY BALLOON.—Mr. Andrée, a Swedish engineer and skilful aeronaut, who wintered in Spitzbergen in 1882–83, has laid before the Academy of Sciences at Stockholm a plan for reaching the North Pole by balloon, starting from the north-western point of Spitzbergen, where the coast is always free of ice by the middle of June.

Mr. Andrée's project has been carefully studied in all its details, and it meets with the entire approbation of Baron Nordenskiöld.

The balloon will be made to carry three persons, with provisions for four months and all the requisite instruments: the total weight not to exceed 3,000 kilogrammes (6,600 lbs.).

Safety buoys will be taken in the car to guard against accidents, and the double skin of the balloon will keep it inflated for a month at a time. In order to navigate the machine Mr. Andrée will use an apparatus which he has tested in several ascents. The balloon is provided with a sail, and from the car hang cables, which drag on the ground and retard the movement through the air. The sail can by this means be brought into play so as to deflect the progress of the machine twenty-seven degrees, and, in some cases, as much as forty degrees, from the direction of the wind.

The balloon will be inflated with hydrogen compressed in cylinders, and the filling will be accomplished inside of a high board fence.

It is on record that a balloon, set free in Paris on the night of November 25, 1870, arrived in Norway the next morning, and at this rate of speed the Pole would be reached in five or six hours from Spitzbergen.

The daily variation of temperature in the polar regions is very slight. At Spitzbergen, in July, the mercury occasionally falls to zero (Centigrade), and rises only a few degrees above it, and there is no fear of a storm.

Mr. Andrée will make his attempt in 1896.

EXPLORATION OF THE MACKENZIE.—M. C. de Lalande, Consul of France at San Francisco, in a letter of April 5, sends to the Paris Geographical Society, through the Ministry of Foreign Affairs, the manuscript itinerary of M. de Sainville's travels in the Mackenzie River basin in the years 1889–1894, accompanied by 29 photographic views of the country and a map of the route. (*Comptes Rendus de la Société de Géographie, Nos. 9 et 10.*)

MAZAMAS.*—This is the name of a society of mountain climbers, which was organized on the summit of Mount Hood, Oregon, on the 19th of July, 1894. Its organization, we are told, was unique and successful, and this year the society aspires to convey, on the 10th day of July, a sunbeam message by means of heliographs from British Columbia to Mexico, and transmit an answer from Mexico to British Columbia.

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* Apparently the Mexican name (plural) of the pronghorn (antilocapra americana).

The principal mountains in Oregon and Washington available for the purpose are Baker, Rainier, St. Helens, Adams, Hood, Jefferson, Three Sisters, Diamond Peak, Thielsen, Scott and Pitt, and in California Mt. Shasta, Tellac, Round Top, Dana, Lyell, Stillman, Whitney, Lome and Baldy. Sub-stations will be established along the line, and it is expected that each party will make arrangements for procuring photographic views of interesting points.

The main body of the society is to assemble at Mt. Adams, in Washington.

THE CLIMATE OF SAN DIEGO, CALIFORNIA.—The *American Meteorological Journal*, for May, publishes the following data on the climate of San Diego, compiled from the records of the Weather Bureau by Mr. W. L. Hearne, observer:

For the last 22 years the mean temperature has been: January, 57°; February, 55°; March, 57°; April, 57°; May, 62°; June, 65°; July, 68°; August, 70°; September, 68°; October, 63°; November, 57°; December, 57°.

The warmest months were: January, 1877, average 57°; February, 1876, 58°; March, 1885, 60°; April, 1885, 62°; May, 1885, 63°; June, 1885, 67°; July, 1891, 69°; August, 1885, 72°; September, 1889, 70°; October, 1875, 67°; November, 1890, 64°; December, 1890, 61°.

The coldest monthly averages were: January, 1892, 50°; February, 1882, 51°; March, 1880, 52°; April, 1872, 56°; May, 1875, 60°; June, 1873, 63°; July, 1880, 63°; August, 1880, 66°; September, 1880, 65°; October, 1886, 60°; November, 1886, 56°; December, 1891, 52°.

The greatest precipitation of rain in any month was 7.71 inches, in December, 1887. The greatest rainfall in 24 consecutive hours was 2.94 inches, January 12 and 13, 1892. No killing frost occurred in the twenty-two years. The greatest velocity of the wind was 39 miles an hour, recorded in April, 1877 (day not given).

The same journal, for June, has a paper by John D. Parker on California Electrical Storms, from which the following statements are taken:

One of the peculiar features of the weather of Southern California is the infrequency of electrical storms. In San Diego people do not protect their buildings against lightning, and the writer has been unable to discover a lightning rod in Los Angeles. The Weather Bureau has reported only two electrical storms at San Diego during the last sixteen years.

One of these storms occurred on August 27, 1894, and it may be taken as a type of all electrical storms in this region. On that day there prevailed a close, sultry atmosphere, with a stoppage of the sea-breeze, replaced by fitful currents of hot air from the desert, and a filmy vapor cast a slight veil over the face of the sun. About midday the observer, at San Diego, from the roof of his building, saw far to the south fifteen or twenty very small thunder-heads, appearing conical above with flat bases. These thunder-heads moved slowly northward along the San Jacinto Mountain range, and arrived opposite San Diego about sunset, where, by the enlargement of the visual angle, they seemed to fill the whole heavens with black masses of cloud. The edge of this Sonora* brushed by San Diego that evening with an electrical display which was quite vivid in the mountains.

This storm brought to San Diego a warm shower of rain, which measured 4 inches. A bolt of lightning struck a wire in the city, and burnt out the coil of one of the dynamos in the engine-house, which extinguished for a brief period the incandescent lights all over the city.

THE BALTIC AND NORTH SEA CANAL.—Vice-Admiral Batsch contributes to *Globus*, for May, an account of the canal just opened between the North Sea and the Baltic, preceded by a historical sketch of the project.

The present canal is in a large measure due to the efforts of the Hamburg ship-owner Dahlström, who advocated it for years before it received the support of Prince Bismarck, and had the route surveyed at his own expense. It runs in a general north-easterly direction, from Brunsbüttel, at the mouth of the Elbe, to Rundsburg, where it joins and incorporates the old Eider Canal, and finds its termination at Holtenau, on the Bay of Kiel.

The act authorizing the construction was passed March 16, 1886, and an Imperial Canal Commission was appointed, with headquarters at Kiel.

A lock is built at each end to control the water-level, the tideless Baltic being five feet below the high-water mark of the lower Elbe; a difference of level which would give rise to currents in the 61 miles of the waterway. The canal has a width of 72 feet at the bottom and nearly 200 feet (60 metres) at the surface, with a depth of nearly 28 feet, and will admit the largest ships. The general level will be that of the harbour of Kiel, and the lock at the eastern end will remain open nearly all the time, there being only 25 days in the year when noticeable fluctuations occur.

The canal shortens the voyage from Kiel to Wilhelmshaven by 238 nautical miles.

Another writer† gives measurements strangely unlike those furnished by Vice-Admiral Batsch. Both make the length of the canal 98.65 kilometres (61.3 miles), and the width at the bottom 72 feet (22 metres), but in the *Deutsche Rundschau* the breadth at the surface is made 65 metres (213.26 feet), and the depth 9 metres (29.53 feet). The engineer or the admiral, or both, must be wrong; it were rash to choose between them.

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* A local term, explained further on, where Mr. Parker says: "The thunder storms of this region are Sonoras, that move northward two or three times a year from Sonora and contiguous regions, where they originate."

† Civil-Engineer Joseph Riedel, in the *Deutsche Rundschau für Geographie und Statistik*, for May, 1895.

That the passage may be left free to war-ships on occasion, waiting-stations for other vessels are established at intervals of 12 kilometres (7½ miles) Each of these stations has a length of 450 metres (1,476 feet), and a width, at the bottom, of 60 metres (197 feet).

The locks at the outlets have a clear breadth, between the gates, of 25 metres (82 feet), and a depth of 9.8 metres (32 feet), and will admit a ship 150 metres (492 feet) in length. The largest German ironclads measure 112 metres (367 feet) long by 22 metres (72 feet) broad, with a draught of 8 metres (26¼ feet). Although the great transatlantic steamers, 192 metres (630 feet) in length, are too large for the locks, they will be able to pass through the canal, for, while the gates on the Baltic are hardly closed during the year, those on the Elbe can be opened for three or four hours at the time of high-water.

Besides the shortening of the voyage from sea to sea, the advantages of the canal are: the development of commercial intercourse between the two coasts, and the saving in life and property by avoiding the dangerous navigation around the Skaw, the northern point of Denmark. The returns show that 35,000 vessels yearly pass through the Sound. In the period 1877–1881, 92 German vessels, with an aggregate tonnage of 20,000, and valued at between 3,000,000 and 4,000,000 marks, were totally lost in the passage, and 69 others went down at points not ascertained, while 708 persons perished. The number of vessels stranded on the Swedish and Danish coasts between 1858 and 1885 was 6,316, and of these 91 steamers and 2,742 sailing vessels were lost.

The yearly average losses by the voyage around the Skaw are 200 ships, with cargoes valued at 10,000,000 marks, and not less than 500 lives. The coast near Agger bears the significant name of the "Ships' Graveyard," or the "Iron Coast."

Dr. Reinhard Peck, Curator of the Museum, and for twenty-three years an Honorary Member of the *Naturforschende Gesellschaft*, of Görlitz, died in that city on the 28th of March, at the age of 72 years.

The Lisbon Royal Academy of Sciences announces the death of its Secretary, Manoel Pinheiro Chagas, on the 8th of April, 1895.

THE TŌKYŌ SEISMOLOGICAL OBSERVATORY.—This observatory, created and for so many years directed by Mr. John Milne, was destroyed by fire on the 17th of February. The calamity is described by Prof. Milne in a letter prepared, as he says, *for maiden aunts and relatives*, and communicated to *Science* of April 19, by Prof. T. C. Mendenhall, a friend and fellow-worker of Mr. Milne's in Japan, in former years.

The losses are, for the most part, irreparable, and the public, including the maiden aunts, may well be surprised at the buoyant tone of the following account:

> As nearly all the transactions of the Seismological Society were packed up to go to Europe, a few that had middle places in the boxes may be saved, but I doubt if even out of 2,500 copies I shall get more than two or three hundred. All my old earthquake books, some of which even dated from 1500 to 1600, but which were perhaps more curious than useful, seem to have gone. One function they had was to inspire the globe-trotter, or travelling clergyman, with respect for a science that was apparently so ancient. Amongst them there was a poem called "The Earthquake," A. D. 1750, but I know that by heart. The new books were volumes of bound pamphlets in all sorts of languages which I had slashed out of the publications of all sorts of societies. Perhaps the burning of them was a visitation for my Goth-like behaviour.
>
> Instruments were fused or vaporized. Sixteen specially constructed clocks which would turn drums once a day, once a week, or drive a band of paper for two years, together with seismographs and horizontal pendulums, self-recording thermometers and barometers, microscopes, and a museum of old and new contrivances are now in the scrap heap. Until to-day, I felt I had the observatory I intended to put up in England completely furnished, and I was proud of the furniture. . . . . . But what happened was the unexpected; the fire broke out in the midst of a pile of wood in an outhouse, and this, with a nice wind blowing, on a Sunday morning, when there was no one near to help. And now I have next to nothing—decorations, medals, diplomas, clothes, manuscripts, extending over twenty-five years, and everything else has gone up in smoke; still it is not altogether a misfortune. I shall not have a sale, nor the worry of selecting amongst my accumulations; there will be no buying boxes and packing up, neither will there be any haggling with custom house officials, or trouble in collecting on an insurance policy. On the other hand, I shall have new clothes, and some time or other, I hope, new clocks and new instruments, whilst what I have got is the knowledge that I have many sincere and kind friends. Their clothes don't fit, but the sympathy that they have expressed and the little things they have sent me tells me that I should never be homeless in Japan. Looked at in the right way, like an earthquake, a fire may, after all, be a blessing in disguise, but, of course, it is sometimes pretty well wrapped up.
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> "Dies iræ, dies illa,
> Solvet sæclum in favilla."

Mr. Milne's address book was burned, and he asks all those to whom Vol. IV of the *Seismological Journal* may be due to address him, care of *The Japan Mail Office*, Yokohama.

Out of the few hundred copies, more or less, of the Transactions of the Seismological Society of Japan, he will be able to make up some sets; and those desiring to obtain them should write to him, care of the Geological Society, Burlington House, London. He earnestly desires to receive, in exchange or otherwise, copies of any papers on or relating to earthquakes, volcanoes or earth movements in general.

Mr. E. von Rebeur-Paschwitz writes from Merseburg to *Nature*, of May 16, concerning some of Prof. Milne's late observations:

> A few days ago I received from Prof. Milne a letter, dated March 15, 1895, in which he sends me a list of earthquake disturbances, compiled from the records he was fortunate enough to rescue from the fire which destroyed his house on February 17. In this list I find no less than three observations of the great Argentine earthquake of October 27, 1894, which was recorded by three different horizontal pendulums. The times given for the beginning of the earthquake—viz., 18 h. 0 m., 18 h. 5 m., 17 h. 41 m.*—are not very trustworthy . . . . . the error cannot exceed a few minutes. The duration of the disturbance was between two and three hours in all the three instruments. If we consider that the error of the first observation is not likely to exceed ten minutes, then we find . . . . that, although the spherical distance between the epicentre of the earthquake and Tokio is *no less than 17,400 kilometres* (10,812 miles), the earth-motion reached Japan at about the same time, or perhaps even a little earlier, than it arrived in Europe . . . . . Prof. Milne's observation is probably the first in which an earthquake was noticed by seismic instruments at a place so near the antipodes of the earthquake centre. A straight line between the two points is only very little shorter than the earth's diameter; the time required for the motion to pass through the globe was probably less than twenty minutes.

The same journal, of May 30, notes the occurrence of an earthquake, recorded at Tōkyō on the 18th of January, 1895, and registered by the seismometrograph of the Collegio Romano at Rome within 50 minutes; the distance being 9,500 kilometres (5,900 miles).

THE LUCHU ISLANDS.†—In a paper printed in the *Geographical Journal*, Vol. V, Nos. 4, 5 and 6, Prof. Basil Hall Chamberlain, of the Imperial University of Japan, describes the Luchu Islands and their people. Little known as they are, these islands possess a complex civilization, an ancient and checkered history, and a language capable of throwing welcome light on Far-Eastern philology. They stretch from the south-western extremity of Japan to the north-eastern extremity of Formosa, the number of islands being 36, divided by Mr. Chamberlain into six groups, as follows:

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* These hours are Japan time, *i. e.*, 9 h. east of Greenwich, and are reckoned from noon.

† The name is written in many ways. Mr. Chamberlain adheres to the forms *Loochoo* or *Luchu*, because they have been most generally employed by English writers and cartographers for nearly a century past.

1. The *North-Eastern*, of four islands. Of these Tane-ga-shima is admirably cultivated and contains a population of 23,000, and Yaku-no-shima, a circular island of 15 miles diameter, is covered with forests, and its mountains rise to a height of over 6,000 feet. Theft is unknown among the 8,800 people of this happy spot;

2. The *North-Western*, of three islands, Iwo-ga-shima, the most important, being rich in sulphur;

3. The *Shichi-to* (Seven Isles *), small and unimportant. Some of these islands are active volcanoes;

4. The *Oshima* group, eight in number. Of this group Oshima, 30 miles long by 17 wide in the broadest part, lies in the way of the *Kuroshiwo*, and has a very moist climate and a luxuriant vegetation. Four of the smaller islands produce considerable sugar;

5. The *Central Group*, or Luchu Proper. This has nine islands. Okinawa, or Great Luchu, is 56 miles long, with a breadth of from 2 to 14 miles. The northern part is rough and thinly peopled, but the central and southern parts are carefully cultivated, and support a dense population. The other islands, except Kume-jima, which is noted for a much-prized silk fabric, are without importance;

6. The *Saki-shima* Group, or Further Isles, contains four considerable islands and a number of islets, all inhabited.

One mountainous island, Iri-omote-jima, is covered with a dense forest. It has a bad climate, and malarial fever is endemic. According to the official census of December 31, 1891, Luchu Proper and the Further Isles contain 82,477 houses, with a population of 410,881. Of the population 95,000 are classified as nobility and gentry, and 235,000 as common people.

Some of the islands are volcanic; others, such as Great Luchu, of coral formation. The Further Isles, though surrounded by coral reefs which make navigation perilous, are in part of volcanic origin.

The cattle and horses are small, as are the deer and the wild pigs. The monkey, so common in Japan, is unknown. A poisonous snake, the *habu*, abounds in Oshima and Toku-no-shima. It is four or five feet long and two inches in diameter. It enters the houses and springs out at passers-by from the hedges, and, within recent years, it so infested one village that the inhabitants abandoned their houses.

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* There are really eight, Mr. Chamberlain says, in spite of the name.

The flora diverges widely from that of Japan. The bamboo is rare; there are several palms, many ferns and tree-ferns, and an enormous number of cycades, which furnish a kind of sago. The cultivated plants are sugar-cane, sweet potatoes, tobacco, indigo, pumpkins and gourds, Indian corn, beans, cereals, radishes and the like. Every suitable spot of land, even to the brink of the sea, is laid out in rice-fields.

Speaking broadly, the winter is the dry season, the late spring and summer the wet one, and the climate is salubrious in most of the islands. All the Luchus are swept by the dreaded typhoons.

Mr. Chamberlain notes the curious fact that in the Japanese archipelago the vegetation diminishes in rankness as one travels from the north to the south. In Yezo the grasses are higher than a man on horseback; in Central Japan they rise to the height of a man, and in Great Luchu there are no tall grasses, and very few thickets.

The history of the islands, as told by Mr. Chamberlain from the study of the records, has little interest. The political arrangements, he remarks, seem to partake of an *opéra comique* character, with public offices and officers almost without end, until we begin to wonder whether there is any population left to govern. None the less, he affirms that there has been progress:

> For the general assertion may safely be hazarded that Oriental stagnation exists only in Occidental fancy.

Perhaps so, in a sense; but there can be no agreement without an accepted definition of terms. What is stagnation and what is fancy? The most prominent race characteristic of the Luchuans is a moral one. They are marked by gentleness of spirit and manner, by a yielding and submissive disposition, by hospitality and kindness, and by aversion to violence and crime. Mr. Chamberlain's experience in 1894 agrees with that of every visitor to the islands except Perry, who, possibly, did not see things as they were.

MANCHURIA.—The Rev. John Ross, D.D., who has known Manchuria for twenty-two years, describes it in an interesting paper, printed in the *Scottish Geographical Magazine*, for May.

The country is a great plain, lying between the port of New-Chwang, on the south, and the Amur River, on the north-east. On the west the plain is bounded by the hills of Mongolia, and on the east by low mountain ranges. The highest mountain of Manchuria is the "Ever White Mountain" in the extreme north-east, so called from the appearance of its upper ridges, which are composed of pumice, and, according to Mr. Younghusband's measurement in 1886, not more than 8,000 feet in altitude.

Earthquakes are rare and slight, but there is every indication that they were severe in remote ages, and the signs of volcanic activity abound. Not far from Ninguta there is an extensive field of lava, which sounds hollow to the tread. The most common rocks are basalt and granite, quartz and quartzite, and a coarse white marble.

The centre of the water-shed is the Ever White Mountain, and from it flow the Usuri, the Sungari, the Yalu, which bears immense rafts of timber, pine, oak and walnut, to New-Chwang, which also receives by the Liao River the vast quantities of grain accumulated every autumn in the north.

The soil of Manchuria seems to be a mixture of two-thirds clay and one-third sand. In winter and in dry weather it cracks in all directions. It is extremely fertile, and produces full crops year after year without manuring.

Baron Richthofen's theory that this soil is formed by dust-storms is not accepted by Mr. Ross, who finds the origin of the *loess* in the disintegration of the granite and the pulverization of the basalt. The process of transformation may be seen on the line of hills skirting the great plain.

There are four and a half months of summer, five of winter, one of spring and one and a half of autumn. The winter ends with March, April is the spring month, and summer begins with May.

The rains are light till the end of July, when they become heavy and long-continued and flood the country. September is the harvest month, and nothing can be finer than the October weather—dry and clear and mildly warm. The winter comes in November; the ice forms three or four feet thick, and the ground is frozen to the same depth. The greatest cold is usually 17 degrees below zero (Fahr.), though it sometimes sinks to 27 at Mukden, and at Kirin to 40 degrees below zero. Even in midwinter the sun is so hot that it is unpleasant to sit against a window with a southern exposure. The greatest heat is 100 degrees in the shade.

The minerals are gold, silver, copper, coal, and excellent iron.

The principal crop is "tall" millet, or *sorghum*, the chief food of the people. It produces eight hundred-fold. The "small" millet, like birdseed, is said to produce ten times as much.

Besides these, the people cultivate barley, wheat, beans, Indian corn, tobacco, opium, indigo, jute, hemp, and the castor-oil plant, kitchen vegetables and many roots. The fruits are grapes, plums, apricots and peaches. Game and fish abound.

The most important industries are those of the furrier and tanner. Mr. Ross thinks that there are probably more furs cured in Mukden than in any other city of the world.

The population can hardly be less than 25,000,000. Mukden, the capital, has 300,000, and there are many large cities and towns and on the great plain villages and hamlets are planted so thickly that one is hardly left behind before another is entered. Mr. Ross found, by making a careful list of the villages within a radius of 3½ miles, a population of 100,000, living wholly by agriculture. A steady stream of immigration from Northern China has poured into Manchuria for two hundred years, and at least three-fourths of the people are pure Chinese, and the Chinese language is universal.

The peasantry live on their own small properties. Food, fuel and clothing are abundant, and the taxation is probably the lightest in the world.

THE MAP OF AFRICA.—Lieut.-Gen. E. F. Chapman, F.R.G.S., makes, in a letter to Mr. Markham, President of the Royal Geographical Society, some excellent suggestions with regard to the mapping of Africa. He recognizes the good work which has been done in South Africa, in Algeria and Tunisia, and in East Africa, and he quotes the following passage from the report of the Surveyor-General, British Bechuanaland, for the year 1890–91:

> From a practical point of view the value of this work can hardly be overrated; in many countries erroneous surveys are one of the most fruitful sources of litigation and waste of money in connection with disputed land boundaries, necessitating very often the enormous expense of subsequent geodetic triangulations and re-surveys of land grants. The Imperial Government has conferred a great boon on this territory by authorizing a geodetic triangulation as the basis of all future survey operations. . . . We are indebted for the great practical advantages we are already reaping from this work, viz., the correct and uniform data supplied to our surveyors, which enables them to do their work in a satisfactory manner, and the great facility and accuracy with which in this office we are enabled to lay down on the map of the country the results of every survey which has been connected with the trigonometrical piles.

In conclusion, he invites the attention of geographical societies and the International Geographical Congress of 1895 to these subjects:

(1.) The advantages to be gained from an economic as well as from a scientific point of view of extending geodetic surveys in the settled portions of Africa.

(2.) The importance, in districts beyond the probable range of geodetic surveys for the next few years, of making surveys of areas rather than of routes; and the advisability of basing such surveys on rapid theodolite triangulations, wherever it is practicable to do so.

(3.) The desirability of collecting a complete record, as regards Africa, of all the positions that have been accurately fixed astronomically in areas that have not been triangulated, and of combining measures for the purpose of determining new positions, taking care that, in the case of all future observations, full data should be published so as to enable the geographical world to appraise them at their proper value.

(4.) The advantages to geodetical science of trigonometrically connecting the triangulation of India with that of Europe by joining it on to the Russian triangulation of Trans-Caucasia.

THE WEBI SHEBELI.—Dr. Donaldson Smith, in a letter addressed to the Royal Geographical Society, under date of December 14, 1894, writes:

> . . . . The river which forms the principal source of the Webi Shebeli, and which I shall call after myself, winds south as it passes in front of Mount Abougassim . . . . A large tributary of the Jub River had carved its way through a hill for one mile, as it curved south-east through a deep canyon. This stream is called the "Web," and the river Smith is called the "Wabi" by the natives; but the names are often confused, so I have named the "Web" River Gillett, and the caves I have marked on my map as the Caves of Wyndlawn.*

Dr. Smith does not profess to have discovered these rivers, and the unusual names which he chooses to bestow upon them can have no significance for other men.

The *Bollettino* of the Italian Geographical Society (Fasc. III and V, 1895) protests against the abuse, in this instance, of the explorer's supposed right, and the *Geographical Journal* remarks that if a European name is to be given to the Webi Shebeli, it is surely that of Haines.†

It may be assumed that the rivers will continue to be known as the Webi Shebeli and the Web, since, if there is no authority to forbid the giving of unnecessary names, there is none to compel the recognition of them, when given.

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* Geographical Journal, Vol. V, No. 2, p. 126.

† . . . . It was Lieutenant Christopher who first reached its lower course in 1843, and who named it after his distinguished superior, Captain Haines of the Indian Navy (Geog. Jour., Vol. V, No. 5, p. 485).

REPORTED DEATH OF E. J. GLAVE.—The following telegram appeared in a New York paper of June 18:

> LONDON, June 17.—E. J. Glave, the explorer, who had just travelled from Zanzibar to the Congo for the hundredth time, died recently at the mission station in Underhill, near Matadi, on the Congo. A memorial was erected a mile from the grave.

Although but 32 years of age, Mr. Glave had done much good work in the exploration of Central Africa. He began his career under Stanley, who says of him:

> Mr. E. J. Glave . . . . is one of those young Englishmen who, in 1883, were sent to me for service on the Congo, by the Chief of the Bureau of the International Association of Brussels. I soon recognized in Mr. Glave those qualities for which I was eagerly searching. . . . He was tall, strong, and of vigorous constitution, with a face marked by earnestness and resolve. . . . I was in need of a chief for a new station that was to be built at Lukolela—a place about three hundred miles above the Pool, and I selected him.
>
> On reaching the locality I pointed out to Mr. Glave the site of the future station, and certainly nothing could be more unpromising and more calculated to damp mere effervescent ardor than the compact area of black forest—raising its tall head two hundred feet above the bank—and shadowing so darkly the river's margin—but Mr. Glave regarded it with interest, and a smile of content, and accepted the responsibilities then and there entrusted to him with a pleasure not to be suppressed. We landed and made fast . . . turned to and commenced to chop the forest giants down . . . I was absent for a few months up river. . . . . But when I came opposite Lukolela Woods I curiously examined the extent of tree-clad bank, and long before we came to the landing-place we found that the clearing had been vastly increased, and a large sunny area was revealed, and a commodious house flanked by rows of neat huts was approaching completion. . . . . I always regarded Mr. Glave as one who in the future would probably surpass his opportunities. . . . His conscientiousness, his inflexible determination to do the most that can be done in a given period, the love with which he sets about it, and the absorbing interest it has for him, make me, who knew his worth, feel sorry that he cannot find the peculiar hard task for which he is so fitted. . . . . (Introduction to *In Savage Africa*, by E. J. Glave, New York, 1892.)

The qualities of the youth remained with the man, and all who knew Mr. Glave felt an attachment to him. With all his strength of character he was modest and gentle, and he exercised a remarkable influence over the wild men with whom he lived, whether in Africa or in Alaska. It was his hope to do effective work in breaking up the African slave-trade, though he made no profession of the task to which he had devoted himself in singleness of heart.

His untimely death frustrates a worthy ambition.

THE ROYAL GEOGRAPHICAL SOCIETY OF VICTORIA held an open-air session at Mr. J. W. Lindt's Hermitage on the Black Spur, near Marysville, on the 9th of March, in honour of its president, Baron Ferdinand von Mueller. The Hermitage stands in the middle of a primeval forest, above the valley of the Acheron; a name hardly suggestive of picnics.

A paper by Mr. Lindt described his adventures in an open whaleboat among the islands of the New Hebrides group. The Rev. W. Potter advocated the cause of Antarctic exploration. Baron von Mueller returned thanks for the compliment paid to him, and called attention to the fact that the geographical map of Australia, which, it had been expected, would be completed before the expiration of the present century, was not yet begun; but he still hoped.

WASHINGTON LETTER.

WASHINGTON, JUNE 20, 1895.

The first Government exploration of the mineral fields of Alaska is authorized by an act of the last Congress which appropriated $5,000 "for an investigation of the coal and gold resources of Alaska," to be expended under the direction of the Geological Survey. Prof. George F. Becker (mining expert), Prof. W. H. Dall (Alaska expert), and C. W. Purrington (assistant to Prof. Becker), are already at Sitka, from whence they will go to Kadiak Islands, Cook Inlet, and possibly as far west as Shumagin. They are expected to make a practical study of the economic geology of the Territory. The most productive gold mines in this Territory are located on a belt or zone beginning at Mexico, and running from southeast to northwest, in almost a straight line, to the Arctic Ocean. On this belt, which varies in width from two to twenty miles, are the mines about Juneau, Berner's Bay, Gold Creek, and the placer mines of the Yukon Valley, Forty Mile and Miller creeks.

Prof. Becker has completed his investigations of the gold-producing districts of the southern Appalachian region, on which he has been engaged since last August. He considers this oldest gold-producing region of the country a good mineral one, and the prospects for investment excellent for moderate returns—say 10 to 15 per cent. There are not likely to be any great fortunes made, nor any bonanzas discovered. The gold region is best defined in the Carolinas and Georgia, especially in the southwestern part of North Carolina.

GEOLOGIC MAPS.—As has been already stated in the BULLETIN, the plan adopted for the geologic map contemplates the division of the entire area of the United States into small rectangular districts, bounded by certain meridians and parallels. The maps and descriptions of each rectangular district are issued in folio form. Each folio is designated by the name of the principal town or of a prominent natural feature within the district. It contains topographic, geologic, economic, and structural maps of the area, together with explanations and descriptions. When all the folios are completed they will constitute a geologic atlas of the United States.

The folios now ready for distribution are the following:

NO.	NAME OF SHEET.	STATE.	LIMITING MERIDIANS.	LIMITING PARALLELS.
1	Livingston	Montana.	110°–111°	45°–46°
2	Ringgold	Georgia Tennessee	85°–85°30′	34°30′–35°
3	Placerville	California	120°30′–121°	38°30′–39°
4	Kingston	Tennessee	84°30′–85°	35°30′–36°
5	Sacramento	California	121°–121°30′	38°30′–39°
6	Chattanooga	Tennessee	85°–85°30′	35°–35°30′
7	Pike's Peak	Colorado	105°–105°30′	38°30′–39°
8	Sewanee	Tennessee	85°30′–86°	35°–35°30′
9	Anthracite-Crested Butte	Colorado	106°45′–107°15′	38°45′–39°
10	Harper's Ferry	Virginia West Virginia Maryland	77°30′–78°	39°–39°30′
11	Jackson	California	120°30′–121°	38°–38°30′
12	Estillville	Virginia Kentucky Tennessee	82°30′–83°	36°30′–37°
13	Fredericksburg	Maryland Virginia	77°–77°30′	38°–38°30′
14	Staunton	Virginia	79°	38°

At the uniform price of 25 cents for each folio.

The methods and results of the primary triangulation executed by the United States Geological Survey during the past twelve years, that is to say, since the commencement of work upon the topographic atlas, are stated by Mr. Henry Gannett with great minuteness in a recent Bulletin of the Survey (No. 122). The results have been arranged in chapters by geographical groups, such as New England, New York and Pennsylvania, Southern Appalachian region, etc. Something over one thousand stations are located and described. In explanation of methods, Mr. Gannett says that wherever work has been done by other organizations, which is of sufficient accuracy for the control of the maps of the Geological Survey, such work has been utilized. The work of the Coast and Geodetic Survey, of the Lake Survey, of the New York State Survey has been extensively used. In the interior of the country and in the Far West, the work has been done *ab initio ;* but the triangulation executed by early surveys in the West, known as the Hayden, Powell and Wheeler surveys, has been utilized to some extent for the control or initiation of work; that of the Wheeler but little, that of the Hayden to a greater extent, especially in Colorado. That of the Powell Survey, the results of which have never heretofore been published, has been used very largely. The seventeen maps accompanying this work describe graphically the triangulations already secured.

Mr. Gannett has in press a Dictionary of Geographic Positions.

TOPOGRAPHIC MAPS.—Under a provision of the Sundry Civil Service Act for 1895–'96, which goes into operation July 1, 1895, the Director of the Geological Survey is authorized to sell copies of topographical maps of the United States now in course of construction, with text, at cost, and ten per cent. added. The Director (Mr. Charles D. Walcott) has the plan of issuing these maps under consideration. The proposition is to issue ten maps at one time, with descriptive text, as a folio. These maps will illustrate ten distinct phases of topography that occur within the area of the United States. Subsequent folios will each contain ten maps, illustrating some particular type of topography, as that of the Appalachian Mountain system, that of the Atlantic Coastal Plain region, etc. The cost of these folios will probably not exceed 25 cents. The extent to which the plan will be carried has not yet been fully determined.

The following topographic atlas sheets have been engraved and printed since January 1, 1895:

New York: Mount Marcy.
Ontario Beach.
Rochester.
Plattsburg.
Mooers.
Rouse Point.
Syracuse.
Chittenango.
Oneida.
Oriskany.
Watertown.
Pulaski.
Sacketts Harbor.
Stony Island.
Cape Vincent.
Ausable.

New York: Willsboro.
Cambridge.
Ithaca.
Elmira.
Catskill.
Rhinebeck.
New Hampshire: Crawford Notch.
Washington: Seattle.
Oklahoma: Kingfisher.
Virginia—West Virginia:
Tazewell.
North Dakota: Savo.
Nebraska: Grand Island.
Wood River.
Colorado: Cripple Creek.
Florida: Citra.

Hereafter the report on the Mineral Resources of the United States will be issued as a part of the report of the Director of the Geological Survey, and printed as soon as completed. Separate chapters on any given mineral product will be printed as rapidly as transmitted for publication. The accompanying papers of the Director's annual report, that are of a strictly economic character, will also be issued in pamphlet form.

Congress, at its last session, directed that one copy of each monograph, bulletin or report of the Geological Survey printed prior to the year 1894 should be sent to two public libraries, to be designated by each Senator, Representative and Delegate; such public libraries to be additional to those to which said publications are distributed under existing laws.

A work soon to be issued by the Geological Survey is The Glacial Lake Agassiz, by Warren Upham.

Mr. C. D. Perrine, in a recent Bulletin of the Survey (No. 129), describes the earthquakes in California, in 1894.

In providing for a survey of the Indian Territory, Congress at its last session departed from a long usage, viz., the survey of public lands by U. S. Surveyors-General under the General Land Office, and in this case—the first instance of the kind—authorized the Secretary of the Interior to have the new survey of this Territory made under the direction of the Geological Survey. The Director has already sent parties to the field. Work has been commenced on the Chickasaw lands, and will be carried westward therefrom. It is expected that this portion will be completed by the close of the year, or at least by next spring. The enactment of Congress provides that when any surveys have been made and plats and field notes thereof prepared, they shall be approved and certified to by the Director of the Geological Survey, and that such surveys, field notes and plats shall have the same legal effect and force as heretofore given to the acts of the Surveyors-General.

The United States Board on Geographic names, which it will be remembered was created five years ago by an Executive order, held its 42d meeting recently and adjourned until September next. More than twenty-five hundred cases of disputed names have been decided.

The prominent departures from old methods of speaking which have been approved by the Board, and therefore become binding on all Government officials, are these: Dropping the final "h" in the termination "burgh"; abbreviation of "borough" to "boro"; the spelling of "center" (not like "centre"); the discontinuance of the use of the hyphen in connecting parts of names; the omission of "C. H." after the names of county seats; simplification of names consisting of more than one word by their combination into one word; the avoidance of the use of diacritic characters; the avoidance of the use of the possessive form of names, and the dropping of the words "city" and "town" as parts of names.

The Hydrographic Office, in recent issues of *Notices to Mariners*, furnishes a large amount of new information concerning Alaska. A Coast Survey chart of Cook Inlet (1886) is reproduced, with additions in 1894 by Lieut. J. B. Collins, of the *U. S. S. Mohican.* Lieut. Collins describes with minuteness the coast, the villages, mountains, volcanoes and adjacent islands of this great inlet, from Chugatz Islands to Kamishak Bay. At Redoubt Bay there is a well-marked glacier.

In the same publication Lieut. G. A. Merriam, of the *U. S. S. Concord*, has new descriptions of several islands in the Aleutian group; making important corrections in geographical positions and areas, as in the case of Unalaska Island. Concerning Bogoslof Islands he says: "The proximity of Bogoslof Islands, while hidden in dense fog, was detected when several miles to leeward of them by a smell of sulphur and guano. The birds in this vicinity are numerous. It is reported that Bogoslof is now only one-third of its original height. The water was disturbed on the eastern side of the northern island, and smoke and steam were visible." He says that Yunaska Island is charted about four or five miles northward and westward of its true position. The Islands of Four Mountains of this group are incorrectly shown on the chart in number, grouping and positions. The *Concord* found two islands, both volcano peaks, and not charted, off the west end of Chuginadak, separated by deep channels from the latter and from one another. There is no island westward of Kagamil Island where Kigalgin Island is shown on the charts.

The *Notice* of February 16 contains a new chart of the northwest coast of Umnak Island from an exploration in 1894 by Lieut. E. F. Leiper, U. S. N., of the *Concord.* The issue of February 23d has a chart of the Islands of Four Mountains, from explorations by the same officer.

The Hydrographic Office announces that numerous reports have been received from United States vessels, to the effect that the Semidi Islands are incorrectly charted; and the same as to Cape St. Elias, Cape Suckling and Cape Hinchinbrook and Montague Island.

Concerning the latter island Lieut. Collins makes an interesting statement in *Notices* of February 23d, and in the same issue he gives some general information about the south coast of Alaska peninsula from Kupreanof Point to Cape Pankof.

The same Office has issued a supplement to the Sailing Directory for Bering Sea and the coast of Alaska (edition of 1869), bringing data to the present time. This is the latest and best geography of the region from Point Manley, Yakutat Bay to the Semidi Islands, including Prince William Sound, Cook Inlet, and the Kadiak, Afognak and Trinity group of islands.

In this connection may be noticed also the third Supplement to the Sailing Directory for Newfoundland and Labrador (edition of 1884); and the third Supplement to the Sailing Directory for the Caribbean Sea and Gulf of Mexico (edition of 1890). These volumes contain not merely sailing directions, but the latest geographic investigations and discoveries made by American and foreign navigators.

The Hydrographic Office gives notice that it desires to connect itself with the nautical practice of the Great Lakes. In pursuance of this object it will place within the reach of mariners of the lakes much useful nautical information that cannot be profitably collected and published by private individuals. Some of its publications are circulated among mariners without charge, but in the nature of an exchange, it being presumed that mariners will co-operate with the Office in collecting information for the general benefit. Branch offices, where useful information and the publications of the Office may be procured, have been established at several prominent points on the lakes.

In pursuance of this object the Office commenced March 15th the monthly publication of *Notices to Mariners for the Great Lakes*, occupying a field corresponding to the long and well known *Notices to Mariners* (of seas, etc.). It is in the interests of the immense and rapidly growing lake commerce. Over thirteen millions of registered tonnage passed through St. Mary's Ship Canal alone last season. Steamships quite equal to many of the Atlantic liners will soon carry freight from Chicago direct to European ports, *via* the enlarged Welland Canal. The Hydrographic catalogue of maps includes one hundred and twenty charts of the great water-way from Lake Superior to the Atlantic.

This Office also has in preparation a series of sailing directions for the Great Lakes. There have been published three volumes, covering (1) Lake Superior, including St. Mary's River and Straits of Mackinac; (2) Lake Michigan, including Green Bay and Straits of Mackinac; (3) Lake Huron, including St. Clair and Detroit rivers, and Lake St. Clair. These volumes will be followed by (4) Lakes Erie and Ontario, including the St. Lawrence River to Montreal. At this point connection is made with Hydrographic Publication No. 100, published in 1891, which covers the Gulf and River St. Lawrence, etc.; thus giving complete sailing directions from Duluth to the Atlantic.

These volumes have geographic value also, because they describe the latest developments of the regions traversed.

For the last ten years Mr. George W. Littlehales of the United States Hydrographic Office has been engaged in collecting observations with a view of providing for the deduction of values of the rates of secular change of the variation of the compass for use on the nautical charts of the regions in which the stations are situated. He presents his discussion of part of the observations in a ittle volume recently published by the Hydrographic Office, entitledl *Contributions to Terrestrial Magnetism, the Variation of the Compass.*

The observations have been made at fifty-one of the principal maritime stations of the world since the year 1589, the outranking ones being the Azores (Fayal), Batavia (Java), Cape of Good Hope, Nossi Bé, St. Helena, Aden, and St. Vincent (Cape Verde Islands).

There are also recorded in a form for discussion 1,953 observations at 920 other important maritime stations which he proposes to investigate as soon as the collection of data have become sufficient.

Mr. Littlehales says: "The results as presented also give values of the variation throughout the range of observation, and for the years 1895, 1900 and 1905, and provide the means for readily deducing the value of the variation for any past year not greatly beyond the range of observation, and also for predicting, within an assigned measure of precision, values for the years up to 1910, for the purpose of stating the correct direction of the magnetic meridian on the charts."

By an act of the last Congress, the States west of the Mississippi containing arid or desert public lands are entitled to receive from the Government, free of cost of survey or price, not to exceed one million acres of such land in any one State, on the proviso that any State making application for the same shall cause such land to be irrigated and reclaimed on such plans as the Secretary of the Interior shall approve.

The States affected by this legislation are California, Montana, Idaho, Wyoming, North and South Dakota, Nevada, Utah, Colorado and Kansas, if the latter has any land still open to settlement that can be called arid. The object of the enactment is declared to be "to aid the public land States in the reclamation of the desert lands therein, and the settlement, cultivation and sale thereof in small tracts to actual settlers"; that is to say, in quarter sections to citizens who shall settle on them.

Before the application of any State is allowed or any segregation of land from the public domain ordered, the State must file a map of the land proposed to be irrigated, which shall exhibit a plan showing the mode of the contemplated irrigation. But the State shall not be authorized to lease any of the lands or to use or dispose of the same except to secure their reclamation, cultivation and settlement.

It is reported that the Government of Great Britain has selected Fanning Island, located 1,200 miles southward of the Hawaiian group, as a mid-ocean landing for a Pacific cable; the effort to secure a landing on Necker Island having failed on account of a treaty arrangement between the United States and Hawaii which prevented such concession. Fanning Island, over which Great Britain raised her flag in 1888, was discovered by an American ship in 1798. It is ten miles long, four miles wide, of an oval shape, and incloses an harbor.

The line projected is from Victoria, B. C., to Australia. From Victoria to Fanning Island the distance is 3,860 miles, and to Australia, 7,000 miles. The estimated cost is about $1,000 per mile.

Meanwhile, Mr. A. J. Coote, an Australian who is interested in different cables, is reported to be on his way to Washington with a proposition to lay a line from Monterey to Honolulu. He is said to represent a French company which is willing to build from Sydney to San Francisco, taking in Auckland, Samoa and Honolulu.

The Canadian Government is informed that the Hawaiian Government has made important concessions to Huddarts' Australian Steamship Line, by which the company, in consideration of carrying all Hawaiian mails without charge, and of holding the present schedule of passenger and freight rates, is given freedom from all charges at the port of Honolulu, except pilotage and water, and free use of land for the storage of coal for its vessels.

Attention was called in the last issue of the BULLETIN to Mr. Rockhill's "Diary of a Journey through Mongolia and Tibet in 1891 and 1892." There has recently appeared from the pen of the same writer, "Notes on the Ethnology of Tibet," published as an extract or "separate" from the Report of the U. S. National Museum for 1893. The work is based upon the Tibetan Ethnological collection in the Museum, which is liberally drawn upon for well-chosen illustrations.

After defining the origin of the word "Tibet," the writer describes the geographical position of the country. It forms an integral portion of the Chinese Empire; is an elevated plateau, and one of the best defined natural regions in the world. These natural divisions are three,—according to the altitude of the country above the sea level and the trend of the valleys:

(1) The northern plateau, with an average altitude of 15,000 feet. (2) Valleys parallel to the southern edge of the northern plateau, which nowhere descend below an altitude of 10,000 feet. (3) Valleys trending approximately north and south in the eastern portion of the country, and which descend to an altitude of 6,000 feet above sea level.

He narrates the history of its civilization derived from Tibetan and Chinese sources, and concludes that the present civilization and rather advanced degree of culture is entirely borrowed from China, India and possibly Turkestan, and that Tibet has contributed only the simple arts of the tent-dwelling herdsmen.

The general appearance of the people, and their physical characteristics are well described, and the author remarks that: "Intercourse with these people, extending over six years, leads me to believe that the Tibetan is kind-hearted, affectionate, and law-abiding, and that many of the most objectionable features in his character only appear in his intercourse with foreigners with whom he has had hardly any relations, and whom he instinctively fears and mistrusts, in view of the open hostility shown them by the official class throughout the country."

He speaks cautiously of society organization. As to consanguineal conditions he say: "The looseness of the marriage relations, the difficulty of identifying people who are only known by surnames, together with the habit of never using a person's name when addressing him or her, and the very marked disinclination of this people to speaking of their families or family affairs, make researches on this subject extremely difficult. The fact that throughout Tibet not only polyandry but also polygamy obtains, adds wonderfully to the confusion in which the question of consanguineal organization is involved." A table contains eighteen names of the various degrees of relationship,—all that he was able to note. The women attend to bartering, and keep nearly all the shops. Property is inherited by sons or brothers; daughters or wives get nothing.

The present coinage of Tibet has been in use since the middle of the 18th century. It comprises only one coin, a silver one of the nominal value of about 16 cents. Fractional money is made by cutting this coin into pieces, but in most parts of the country money is little used, the people bartering for many of the things they require.

H.

Actual Africa; or, The Coming Continent. A Tour of Exploration. By Frank Vincent. With Map and over One Hundred Illustrations. 8vo. New York, D. Appleton & Co., 1895.

With this volume of 500 pages, Mr. Vincent brings to a close the work of twenty-five years dedicated to a full and systematic tour of the globe. Fifteen of these years were spent in actual travel, as follows: One in the great islands and archipelagoes; two in the United States and British America; three in Europe; three in Asia; three in Central and South America; and three in Africa.

It is needless to add that Mr. Vincent travelled for the love of it, that he was interested in all the sights he saw, and that his book is a record of real and vivid impressions. He tells his story in an unaffected way, and he treats his reader with respect.

The illustrations are nearly all good.

Distribution of the Magnetic Declination in Alaska and Adjacent Waters for the year 1895, with one Chart. A report by C. A. Schott, Assistant (U. S. Coast and Geodetic Survey, Bulletin No. 34.) 8vo. Washington, 1895.

Up to the year 1892 it was believed that in south-eastern Alaska, and even as far south as the State of Washington, the direction of the magnetic needle was either stationary, or moving slightly to the westward; but observations made since that time at Sitka and Fort Wrangell, at Seattle and Tacoma, and the discussion of observations made at Esquimalt, Vancouver Island, between the years 1858 and 1892, establish the fact of an increasing easterly declination for those points and the adjacent regions. The observations of 1889 and 1890 at Fort Yukon, in the interior, showed a declination decreasing by a few minutes per annum, in accord with the easterly decline along the shores of Bering Sea and the Arctic Ocean.

The chart exhibits the isogonic curves for 1895, constructed by the analytical method.

Die Länder des Islâm nach Chinesischen Quellen, von Prof. Dr. Friedrich Hirth. I. (Supplément au Volume V du "T'oung-Pao.") 8vo. Leiden, 1894.

This first part of Dr. Hirth's work has had the advantage of revision and annotation by Dr. M. J. de Goeje, the distinguished professor of Arabic in the University of Leyden. The paper was written at Shunking, on the upper Yangtse-Kiang, not many hundred miles from the frontier of Tibet, and without the help of much-needed books of reference on Arabic matters.

Dr. Hirth's argument is that the Chinese notices of the Mohammedan countries are as correct and copious and, when rightly taken, as intelligible as the Arabic accounts of China. He goes even further when he asserts that, notwithstanding all that has been accomplished by Yule for the elucidation of Marco Polo, the best yet remains to be done. We shall have to take his word for it, and continue to believe in Sir Henry until we see the better work.

The Chinese author of the 14th century, translated by Dr. Hirth, gives the following description of Mecca:

> The land of Mecca is reached after 80 days' journey westward from Ma-lo-pa (Arab capital city, not identified). This is the place where the Buddha *Ma-hsia-wu* (Mohammed) was born. In the Buddha's house (the Kaaba) the mason-work is of jade, of all colours. Every year, when the death-day of the Buddha comes, the people gather here from all the lands of the *Ta-shih* (Arabs) to do him reverence, and on this occasion they emulate each other in bringing presents of gold, silver, jewels and precious stones; the house also is then newly covered with silk brocade. Farther inland (in Medina?) is found the Buddha's grave. There shines continually, by day and by night, a halo so bright that no one can approach it; whoever passes by shuts his eyes. It is said that he, who in his dying hour rubs his breast with earth taken from this grave, will be born again through the power of the Buddha.

Meteorology, Weather, and Methods of Forecasting, Description of Meteorological Instruments and River Flood Predictions in the United States, by Thomas Russell, U. S. Assistant Engineer. 8vo. New York and London, 1895.

Mr. Russell's preface is pessimistic. He says:

> The hopes that were once entertained that a precise knowledge of coming weather could be gained from the weather-map has (have) not been fully realized. Cases are comparatively rare where it can be of use in predicting the weather. There are not more than six to twelve occasions in the course of a year for any part of the country where successful predictions can be made, and for some places successful predictions are never possible.

This sends us back to the *Farmer's Almanac*, but Mr. Russell does not stand by his preface. He has had long experience in the Signal Service and the Weather Bureau, and his chapter on Weather Predictions shows that he is a master of the subject. Very instructive, also, are the 75 pages devoted to Rivers and Floods and River-Stage Predictions.

His aim is to give almost everything that is considered to be of interest in relation to the weather; a large programme, which has been fairly filled, though with some extraordinary mistakes as to matters of fact. Mr. Russell puts Reykjavik in *Greenland* (p. 67) and Krakatoa in *Java* (p. 135). He writes Hwangho, the name of the river, for Han-kow, the city on the Yang-tse-Kiang (p. 206). The great drought in the Argentine Republic, in the years 1828–1831, is called, we are told, *Il grand seco* (p. 99); the first word being Italian, the second French, and only the third Spanish. He says on p. 88 that the rainfall at Cherrapunjee, in Assam, amounted in one year to 905 inches. No such fall is recorded. Hunter's *Gazetteer of India* makes the annual average 462.85 inches, and adds:

> It is reported that a total of 805 inches fell in 1861, of which 366 inches are assigned to the single month of July.

Most surprising of all is the assertion on p. 98, that there are no glaciers in the tropics.

Kilimanjaro is within the tropics, and Dr. Hans Meyer has described its glaciers. Mr. Whymper found glaciers on the Andes of the Equator; on Altar, on Antisana, on Cayambe, on Chimborazo, on Cotopaxi, on Illiniza, on Sara-urcu, and on other mountains, and he says:

> In essential features the Glaciers of Ecuador do not differ from the Glaciers of the Alps, and in minor points they present little novelty.
> (*Travels amongst the Great Andes of the Equator, p. 349.*)

The Bibliography of the Future. A Paper reviewing the existing Condition of National and International Bibliography, with suggested Reforms. By Frank Campbell (of the Library, British Museum). 8vo. London, 1895.

Mr. Campbell's Paper was read before the Annual Meeting of the British Library Association in September, 1894, and it deserves to be read by every one who is interested in the subject of books.

There is no disputing his statement that bibliography is now in a state of chaos and that the first thing to be done is, to devise a system that shall bring order into the work of to-day. This point fixed, it will be possible to attack the accumulated disorder of the past.

The most conspicuous cause of the existing confusion is rightly declared to be the absence of National (compulsory) Registration of Books, the true basis of all bibliography. Everything should be registered. Mr. Campbell gives an illustration of the present method, as follows:

> Six men write six works upon Agricultural Science.

1. One publishes his work separately, and men call it a "book."
2. The second work is buried in a "Collected Works" series, which is generally provided for by one vague title.
3. The third appears through the medium of a learned society journal, and it is called an "article."
4. The fourth appears also as an "article" in a magazine of the day.
5. The fifth appears as a contribution to a National Encyclopædia.
6. The sixth appears by instalments in an enterprising newspaper.

The "book" is catalogued; the others are passed over, and practically disappear.

If there is to be a systematic bibliography, it must follow substantially the lines indicated by Mr. Campbell; but the immensity of the task will discourage the sturdiest reformers.

Survey of Tides and Currents in Canadian Waters. Reports by W. Bell Dawson, C. E. 8vo. Ottawa, 1894 and 1895.

In the first of these reports Mr. Dawson gives the history of the Survey, which practically began in 1890.

The tides on the Canadian Atlantic Coast vary in amount, from four or five feet in the open Atlantic to twelve and eighteen in the St. Lawrence River and thirty feet and more in the Bay of Fundy, and to follow their movements in a satisfactory way it will be necessary to establish a relatively large number of stations. Up to December, 1893, six self-recording tide-gauges had been placed: one each at St. John, N. B., at South-west Point, Anticosti, at St. Paul Island, Cape Breton, at Grindstone, on the east side of the Magdalen Islands,* at Quebec and at Father Point (unfinished). One has since been added, on the west side of Forteau Bay, in the Strait of Belle Isle.

From the observations already made, it appears that the tide at Quebec is nearly simultaneous in absolute time with that at Dover, and the tide at St. John, N. B., with the tide at Brest. At Halifax, although the tide is earlier than at any of the European ports, it is nearly simultaneous with that at Sandy Hook.

At the outset, it was considered most important to ascertain the nature of the currents at the two main entrances to the Gulf of St. Lawrence; the Strait of Belle Isle and Cabot Strait. The results are:

For the Strait of Belle Isle, the currents are fundamentally tidal and, under normal conditions, run east and west with a velocity of about two knots per hour. The inward flow from the east is rather greater than the outward flow from the west.

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* So stated in the Report, but the map puts Grindstone on the west.

Mr. Dawson notes that the number of the icebergs which enter the Strait is small in comparison with those which pass its mouth. The depth on a line north from Cape Norman does not exceed 50 fathoms. A berg grounded in 1894 in 59 fathoms, off Chateau Bay, measured, above water, 790 feet in length, 290 in width and 105 feet in height.

The observations in Cabot Strait, continued during the greater part of the month of August, established the following facts: A current runs out of the gulf on the western side and another runs in on the eastern side, while in the middle of the Strait the current is weak and uncertain in direction. On the eastern side the velocity is very little more than one knot per hour; on the western side it amounts to 1.80 knots. The channel from the Atlantic inwards has a width of forty miles and the depth exceeds 200 fathoms, but the currents are not felt below 60 or 80 fathoms.

Mr. Dawson remarks that the influence of the St. Lawrence River upon the currents in the Gulf is usually much exaggerated. It is to be remembered that a current of only half a knot per hour through the Strait of Belle Isle would admit a volume of water 40 times greater than the discharge of the St. Lawrence as measured between Montreal and Lake St. Peter.

Oregon, Its History, Geography and Resources. By John H. Mitchell, U. S. Senator from Oregon. 8vo. Washington, 1895.

Senator Mitchell has a good subject, but he does not turn it to account. The historical portion of his paper is a heated discussion of the Oregon controversy with Great Britain; a matter which has lost its interest.

The geography and natural resources of the State occupy about 12 pages of description, mostly adjectives. There are mountain ranges, clothed with eternal verdure and crowned with eternal snow; there are forests unsurpassed in extent, immense fertile plateaus of everlasting green, grand lakes, which mirror back in sublime beauty their mountain walls of granite, and many other well-known properties.

All these are found within an area of 96,030 square miles:

> An area greater in extent by more than 6,000 square miles than all of England, Scotland and Wales combined, with their aggregate population of over 32,000,000; an area over eight times larger than Belgium, with its population of above 6,000,000, and but 6,000 square miles less than one-half that of France, with its 40,000,000 people.

It appears, in fact, that Oregon is larger than any other region that is not as large as Oregon.

Bibliotheca Geographica. Herausgegeben von der Gesellschaft für Erdkunde zu Berlin. Bearbeitet von Otto Baschin, unter Mitwirkung von Dr. Ernst Wagner. Band 1, Jahrgang 1891 und 1892. 8vo. Berlin, W. H. Kühl, 1895.

The Geographical Society of Berlin for many years published, in the last number of its *Zeitschrift* for each year, an accurate catalogue of geographical books, articles, maps and charts. This catalogue was indispensable to all workers in the field of geography. It ceased with the year 1890, and is now replaced by the *Bibliotheca Geographica*, issued as a separate work by the same learned Society.

The first volume, which covers the years 1891 and 1892, contains 506 closely-printed octavo pages and embraces 14,000 titles, which, it may well be said, present the geographical literature of the world for the period. The second volume, devoted to the publications of 1893, will appear before the winter.

Herr Baschin requests the authors of books or articles on geographical subjects to aid him in making the *Bibliotheca* as complete as possible by sending the titles of their contributions to his address:

Otto Baschin,
Berlin W., Schinkelplatz, 6.

Particulars required are: The name of the author, The complete title of the publication, The name, volume-number and page of the magazine, with name of publisher and place, The number of pages, plates and maps (with the scale), The price and the date of publication.

MAP NOTICES.

Atlas of the State of New York, prepared under the direction of Joseph R. Bien. Published by Julius Bien & Co., New York, 1895. Sold by subscription.

This magnificent work, which has been in preparation by Messrs. Bien & Company for the past five years, has appeared and will be welcomed as a very important addition to our knowledge of the State.

The contents comprise a graphic index to the County maps; an excellent map of the United States, reduced from the 9-sheet map of the U. S. Geological Survey; a topographic map of New York State, scale 12 miles to 1 inch; a map of the State, showing location of land grants, patents, and purchases; a series of physical maps, illustrating relief, rainfall and temperature, the density of population, and statistical diagrams, illustrating the population, industries and wealth. These are followed by a series of maps showing counties, upon a scale of 2½ miles to 1 inch. These county maps represent waggon and rail roads, canals, streams, and boundaries of counties, townships, purchases, patents and grants. Relief is expressed by hachures, wherever it is known. It may be added that over most of the area of the State, so little is known of the relief that it cannot be expressed, even in this way. These county maps comprise 26 out of the 36 plates of the Atlas. The cities of New York, Brooklyn, Albany, Syracuse, Rochester and Buffalo, are represented by maps on large scales.

The Atlas contains a full index of place names.

In the preparation of this atlas, full use has been made of the triangulation of the U. S. Coast and Geodetic Survey, the U. S. Lake Survey, the U. S. Geological Survey, and the State (Gardner) Survey, for the correction of positions.

For details of topography, the atlas sheets of the U. S. Geological Survey, covering about ⅕th of the State, have been fully utilized. Elsewhere, local surveys, railroad surveys, and county records have been used, and these have been supplemented by a large amount of original work.

It is but slight commendation to say that this is by far the best atlas of the State ever published, both in respect to accuracy and form.

It is published by lithography, most of the plates being in four colors.

Gewässer und Höhenkarte des Königreichs Württemberg in Maſsstab 1:600,000. Herausgegeben von dem Kgl. Württ. Statistischen Landesamt, 1893.

Relief is effectively expressed by shades of green, buff and brown, at intervals of every hundred metres up to 1,000 metres, thence at 1,500 and 3,000 metres.

ACCESSIONS TO THE LIBRARY.

APRIL-JUNE, 1895.

BY PURCHASE.

History of Richmond County (Staten Island), New York, Edited by Richard M. Bayles, New York, 1887, 4to; The Wild Beasts, Birds and Reptiles of the World, by P. T. Barnum, Chicago and New York, 1888, 4to; The History of the State of Georgia, 1850 to 1881, by I. W. Avery, New York (1881), 8vo; Historical Sketches of Northern New York and the Adirondack Wilderness, by N. B. Sylvester, Troy, 1877, 8vo; An Excursion to the Mammoth Cave and the Barrens of Kentucky, by R. Davidson, Philadelphia, 1840, 12mo; New Indian Sketches, by P. J. De Smet, S. J., New York, n. d., 12mo; History of the Schenectady Patent in the Dutch and English Times, by J. Pearson (*et al.*), Albany, 1883, sq. 8vo; China, a History of the Laws, Manners, and Customs of the People, by John Henry Gray, London, 1878, 3 vols., 8vo; American Medical Botany, by Jacob Bigelow, Boston, 1817–1818, 2 vols., 8vo; History of Mason and Dixon's Line, by John H. B. Latrobe, Philadelphia, 1855, 8vo; The Statesman's Year Book, 1895, by J. Scott Keltie, London, 1895, 8vo; La Colonisation Française en Indo-Chine, par J.-L. de Lanessan, Paris, 1895, 12mo; The River of the West, Life and Adventure in the Rocky Mountains and Oregon, by F. F. Victor, Hartford, 1870, 8vo; Centennial Celebration of the Settlement of Bangor, Sept. 30, 1869, Bangor, 1870, 8vo; Lands of the Messiah, Mahomet and the Pope, by John Aiton, London, 1852, 8vo; Pioneer History of the Champlain Valley, by Winslow C. Watson, Albany, 1863, 8vo; Tenting on the Plains, by Elizabeth B. Custer, New York, 1893, 16mo; Pictures of Travel, Heinrich Heine, Translated by Charles G. Leland, Philadelphia, 1863, 12mo; History of Chautauqua County, N. Y., etc., by A. W. Young, Buffalo, 1875, 8vo; History of the City of Trenton, N. J., by J. O. Raum, Trenton, 1871, 8vo; Proceedings Commemorative of the Settlement of Newark, N. J., on its Two Hundredth Anniversary, May 17th, 1866, Newark, 1866, 8vo; Orient Sunbeams, by S. S. Cox, New York, 1882, 12mo; First, Second and Third Annual Reports, Geological Survey of Texas, by E. T. Dumble, Austin, 1890, '91, and '92, 3 vols., 8vo; Colección de Documentos Inéditos relativos al Descubrimiento, etc., de las Antiguas Posesiones Españolas de Ultramar, Madrid, 1885–86, 2 vols., 8vo; Six Months in Italy, by G. S. Hillard, London, 1853, 2 vols., 8vo; A Tour through the Pyrenees, by H. A. Taine, Translated by J. S. Fiske, New York, 1875, 8vo; Dalmatia, the Quarnero, and Istria, by T. G. Jackson, Oxford, 1887, 3 vols., 8vo; Nooks and Corners in Old France, by George Musgrave, London, 1867, 8vo; A Pilgrimage into Dauphiné, by George Musgrave, 1857, 2 vols., 12mo; The Tour of Mont Blanc and of Monte Rosa, by James D. Forbes, Edinburgh, 1895, 8vo; A Month in Switzerland, by F. Barham Zincke, London, 1873, 8vo; A Narrative of a Journey undertaken in the Years 1819, 1820 and 1821, through France, Italy, etc., by James Holman, London, 1825, 8vo; Sketches from a Tour through Holland and Germany, by J. P. Mahaffy and J. E. Rogers, London, 1889, 8vo; The Pilgrimage of the Tiber, by William Davies, London, 1875, 8vo; Sketches from Nipal, by H. A. Oldfield, London, 1880, 2 vols., 8vo; Carte de l'Ile de Madagascar, Paris, (1895,) sheet; Les Droits de la France sur Madagascar, par Gaston Routier, Paris, 1895, 18mo; La France à Madagascar, par Louis Brunet, Paris, 1895, 18mo; Swiss Allmends, by F. Barham Zincke, London, 1874, 8vo; A Walk in the Grisons, by F. Barham Zincke, London, 1875, 8vo; Sketches of Persia (Sir John Malcolm), London, 1828, 2 vols., 8vo; Outline Sketches of the High Alps of Dauphiné, by T. G. Bonney, London, 1865, 4to; Rhododendron. Scenery of the Swiss Alps, by T. G. Bonney, New York, 1874, folio; Peaks and Valleys of the Alps, by T. G. Bonney, London, 1867, folio; Internationales Archiv für Ethnographie, 1888–89—1893, Leiden, 6 vols., 4to; Le Dahomey, par Edouard Foà, Paris, 1895, 8vo; Bibliography of the Japanese Empire, by Fr. von Wenckstein, Leiden, 1895, 8vo; Akim-Foo: the History of a Failure, by W. F. Butler, London, 1875, 8vo; The Zulus and the British Frontiers, by Thos. J. Lucas, London, 1875, 8vo; The French Dispute in Madagascar, by S. Pasfield Oliver, London, 1885, 8vo; Annual American and English Catalogue, New York, 1895, 8vo; Estudios sobre el Japón, por Enrique Dupuy de Lôme, Madrid, 1895, 8vo; Grants, Concessions and Original Constitutions of New Jersey, by Aaron Leaming and Jacob Spicer, Philadelphia (1752), folio; Atlas Geographus, by Herman Moll, London, 1711–1717, 5 vols., 4to; El Bersheh, Part 1, by Percy E. Newberry, London (1895), 4to; Cartier to Frontenac 1534–1700, by Justin Winsor, Boston, 1894, 8vo; The Mississippi Basin: The Struggle in America between England and France, 1697–1763, by

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TRANSACTIONS OF THE SOCIETY.

APRIL–JUNE, 1895.

A Regular Meeting of the Society was held at Chickering Hall, Monday, April 8, 1895, at 8.30 o'clock P.M.

Vice-President Viele in the chair.

On the recommendation of the Council, Civil Engineer R. E. Peary, U. S. N., was unanimously elected an Honorary Member of the Society.

The following persons, recommended by the Council, were elected Fellows of the Society:

MISS LUELLA A. OWEN,	ST. JOSEPH, MISSOURI.
THOS. LE BOUTILLIER,	
PROF. COURTENAY DE KALB,	ROLLA, MISSOURI.

The following resolutions, adopted by the Council at a meeting held on Saturday, April 6, 1895, were read to the Society:

Resolved, That we have learned, with sincere regret, of the death of William Remsen, a member of this Society for forty years, and for many years Chairman of its Council, who, by the interest he manifested throughout that long period in all matters of geographical inquiry and the extension of geographical knowledge; his uniform regularity in attending all meetings of the Society and of its Council; his assiduous attention to the duties of the office of Chairman of the Council; his sagacious advice and the active part he was always willing to take in the management of the Society's affairs; his liberal contribution towards the purchase of the house we now enjoy; and his urbanity, courtesy and kindliness in all his relations with his fellow associates, made himself one of our most valuable members, and one to whom the Society, especially in its earlier struggles, has been largely indebted for its present position and prosperity.

Resolved, That a copy of these resolutions be sent to the family of our deceased associate.

The Chairman then introduced to the Society Mr. Alfred F. Sears, who delivered a lecture on the Coast Desert of Peru, illustrated with stereopticon views.

On motion, the Society adjourned to the 18th of November, 1895.

THE GREENLAND SCIENTIFIC EXPEDITION.

The steamer *Portia*, carrying the members of this Expedition, left the pier at the foot of Joralemon Street, Brooklyn, at 1 o'clock P.M., on the 22d of June, for St. John's, Newfoundland.

The following letter, reprinted from the New York *Tribune*, gives the details of the organization so successfully carried out by Mrs. Peary:

To the Editor of the Tribune:

SIR: The steamship *Portia*, from Brooklyn to-morrow, will carry the members of the Greenland Scientific Expedition of 1895 to St. John's, N. F. Here they will board the steam barkentine *Kite*, Captain John Bartlett master, and will sail for Greenland about July 1. The expedition will be under the direction of my brother, Emil Diebitsch, of Washington, and the party will be composed of Professor Rollin D. Salisbury, of Chicago University; Professor L. L. Dyche, of the Kansas State University; Theodore Le Boutillier, of Philadelphia, and Dr. John E. Walsh, of Washington. The only passenger will be Echi-och-a, better known as Bill, the little Esquimau girl, who during the last winter has resided with me in Washington.

The expedition has two principal objects in view—first, to reach Anniversary Lodge, Bowdoin Bay, in North Greenland (lat. 77 degrees, 48 minutes), in order to communicate with Mr. Peary, his companion, Hugh J. Lee, of Meriden, Conn., and his faithful servant, Mathew Henson, of Philadelphia, and to enable them to return to the United States; second, to afford the scientists who accompany the expedition opportunities to study the geology and glaciers of the country, as well as the flora and fauna of the region to be visited. Special efforts will be made to secure specimens of the animals, more particularly the walrus, bear, seal and reindeer. At present no group of North Atlantic Walrus can be found in any of our museums.

To raise the funds necessary to fit out and equip the expedition has taken my entire time and attention during the last winter, as well as that of my brother, who has been my constant aid and counsellor. The work has been considerably lightened by the deep interest which the American Geographical Society, the American Museum of Natural History, the Philadelphia Geographical Club and Chicago University have taken in Mr. Peary's explorations.

These bodies have aided me in many ways, and their representatives form the personnel of the Greenland Scientific Expedition of 1895. But of all those to whom I am indebted for help in this, my cause, none have earned a greater share of my gratitude than those individuals who, inexhaustible in resources and tireless in energy, have given their time, their money and their influence to the project and have honestly declined to have their names brought forward in connection with its fulfilment. When I ventured into the lecture field for the purpose of augmenting the slowly increasing fund, I was immediately taken under the protecting wings of the Brooklyn Institute of Arts and Sciences and the National Geographic Society of Washington, and I feel that my success on the platform was largely due to their influence and help.

The parties most directly interested in the success of this expedition are too well known to need more than the briefest mention. Mr. Peary, after his successful journey to Independence Bay, on the hitherto unknown coast of Greenland, in the spring of 1892, conceived the idea of mapping the entire northern coast from Victoria Inlet to Cape Bismarck, and, if possible, to determine and delineate the detached land masses which he saw lying to the north of him. With this object in view, he organized the expedition of 1893–94, with the avowed purpose of staying two years in Greenland, should it require that length of time to complete his work. In the spring of 1894 he was driven back from the ice-cap by unusual storms, and, retreating in good order, returned to headquarters, determined to make another attempt in the spring of 1895.

Upon calling for volunteers to remain another winter in Greenland, one man stepped to the front—Hugh J. Lee, of Meriden, Conn.—"bravest of the brave!" Napoleon would have had him in the Old Guard! The bright picture which his vivid imagination had painted of Arctic life and Arctic adventures when far away in the States in the warm lecture-room had been dimmed by fierce storms and bitter cold; the darkness of the long night had created shadows where before was sunshine, and the whole scene had changed from one of imaginary glory to one of stern reality, and yet he was ready to go through it all again.

This young hero is a native of Malden, Mass., and before coming north was superintendent of the Boys' Club, of Meriden, Conn., of which city his father, O. D. Lee, is a resident. He was for several years a pupil, though not a graduate, of the Meriden High School, and has two brothers older, and a brother and sister younger than himself. "Imagine," says Mr. Bridgman, the historian of the Peary Auxiliary Expedition of 1894, "a dark, almost swarthy, black-haired, blue-eyed, 170-pound young man, 5 feet 7 inches high, and you will have in your mind's eye Hugh Lee, of whom it is no rash prediction that the world in general, and Arctic exploration circles in particular, will yet hear a good deal more."

Mathew Henson, Mr. Peary's faithful servant, is a colored man, twenty-six years old. He was with Mr. Peary in Nicaragua, and was also on the Arctic expedition of 1891–92. He is strong, active, intelligent and willing, and has demonstrated his ability to withstand cold and privation as well, if not better, than some of the white members of the expedition.

In order to bring these three brave men home I have chartered the steam barkentine *Kite*, 190 tons net, and have secured Captain John Bartlett as her master. The *Kite* is a stanch, snug little craft, well adapted for ice work. She carried us north in the summer of '91 and brought us back in the fall of '92. Only 117 feet long and 26 feet abeam, sheathed with live heart, her bows solid and strapped with iron, she is compact and strong. The engine is a vertical one, of fifty horse-power, placed well aft, thus insuring a short crank shaft for the propeller. This lessens the liability to breakage, while there is less friction and consequently greater speed than in many vessels of higher power. The *Kite* draws only twelve feet of water, and answers her helm quickly, and steams about seven knots per hour, all of which are desirable properties in a region where unknown reefs thrust themselves upon you, great icebergs loom up suddenly out of the fog, and the magnetic needle pointeth where it listeth.

Of the *Kite's* master all that need be said is that he is a member of the Bartlett family—a name known for generations among the greatest seafaring people in the world—the Newfoundlanders. Captain John Bartlett is a nephew of the Captain Bartlett who rescued the *Polaris* party from their dangerous position on the ice-floe

He is a brother of the gallant but ill-fated Henry Bartlett, who commanded the *Falcon* in her trips to North Greenland, and who, together with that ship and its brave crew, went down in the storms of last October, on the way from Philadelphia to St. John's. Captain Bartlett is a skilful mariner, who has been "to the ice" every year since he was old enough to haul a rope.

The leader of the expedition, my brother, Emil Diebitsch, in addition to the interest which he would naturally take in the success of Mr. Peary's plans, is well adapted for the work in hand. He is a graduate in civil engineering from Lehigh University, and in the pursuit of his profession has gained valuable experience for just such work as this. In 1887–88 he crossed Nicaragua from ocean to ocean on the line of the Nicaragua Canal, living in the jungle for the greater part of the year. From 1891 to 1894 he was stationed at the United States Naval Station, Port Royal, S. C. When the hurricane and tidal wave of August, 1893, swept over the Carolina coast, he was absent from the station, but immediately hastened to the scene of disaster. The last twenty-five miles of the journey were made on foot through a storm-wasted country. By swimming the bridgeless streams, he managed to report for duty the day after the hurricane, being the first person to bring news from the outside world to the storm-wrecked people. For this he received the official thanks of the Navy Department. Mr. Diebitsch is an active, energetic man, of cool judgment and resolute will. He was a member of the Peary Auxiliary Expedition of 1894, and is therefore acquainted with the region which he is to visit. He has some knowledge of astronomy and navigation, and possesses the complete confidence of both Mr. Peary and myself.

Rollin D. Salisbury, professor of geographic geology in the University of Chicago, geologist in charge of the surface geology of New Jersey, has done much work in glacial and geographic geology, both in the United States and in Germany. Before going to the University of Chicago, Professor Salisbury was connected with the State University of Wisconsin, and still earlier with Beloit College, his alma mater. In addition to holding a professorship in the University of Chicago, he is also dean of the University College in that institution. Professor Salisbury has published many papers and reports on geological subjects, which have appeared in the various geological journals of America and in the publications of the National and New Jersey Surveys. Physically he is a man of splendid proportions, strong and vigorous. He is about thirty-five years of age, and will devote his attention principally to the glaciers, though little of geological importance will escape his alert and scientific eye.

Professor Salisbury is a colleague of Professor T. C. Chamberlain, of the University of Chicago, the geologist of the Peary Auxiliary Expedition of 1894, and his work this summer, together with that of Professor Chamberlain of last year, will make a most exhaustive study of Greenland glaciers, which would in itself warrant the sending of an expedition to the north.

Lewis Lindsay Dyche, professor of zoology, taxidermist and curator of mammals and birds, State University, Lawrence, Kan., is a most enthusiastic and successful collector and naturalist. At the World's Fair in Chicago he received the highest prize for the best exhibit of North American mammals. Professor Dyche was a member of Dr. Cook's Arctic excursion on the ill-fated *Miranda*, and, despite the many mishaps which befell the party, he managed to collect about five hundred animals, some of which were new species, and all of which were abandoned with the *Miranda*. Nothing daunted, Professor Dyche left Gloucester, Mass., on May 15 last on a fishing schooner bound for South Greenland, where he is now, collecting specimens. About July 10 the *Kite* will pick him up at Holsteinborg, and carry him north with the expedition. Here he will have charge of the collections for the American Museum of Natural History.

Theodore Le Boutillier is the representative of the Philadelphia Geographical Club, one of Mr. Peary's stanchest supporters, and a club which, either as an organization or through its individual members, has always contributed generously toward the Peary expeditions. It was under the auspices of the Philadelphia Club that the Peary Auxiliary Expedition of 1894, with Henry G. Bryant in charge, made its successful journey to North Greenland in a season of unusual severity, which proved disastrous to Cook, Wellman and perhaps Jackson. Mr. Le Boutillier is a student of the University of Pennsylvania, originally in the arts department, but now a student of medicine. He is a son of Robert Le Boutillier, of Homer Le Boutillier & Co., of Philadelphia, and has accompanied Professor Heilprin on several expeditions, notably to the Bermuda Islands in 1894. Professor Heilprin describes him as "a most expert collector."

Dr. John E. Walsh, the surgeon of the expedition, is a Washingtonian by birth and education. He is about thirty years old, was for two years lecturer on histology and pathology at the National Medical College, and for some time house surgeon in charge of the Washington Asylum Hospital. When small-pox was raging in Washington last year he was employed as inspector by the Health Office, and did most excellent work, displaying courage, judgment and ability in a very trying position. Dr. Walsh is a member of the American Medical Association of the District of Columbia and various other medical societies. He has contributed numerous articles on medical topics to various medical journals.

Through the thoughtfulness of Messrs. McKay and Dix, ship brokers, I am in receipt of the following encouraging news:

"The steamer *Trox II* arrived at Copenhagen, May 13, from Ivigtut, Greenland, which place she left April 28."

The superintendent of the cryolite mines reports as follows:

"'The winter at Ivigtut has been very mild, so that it was possible to work in the open mines until January 10, when the winter commenced, but without severe frost.'

"We believe this season will form an exceptional one in the Arctic, and it will be possible for a ship to reach Whale Sound without much difficulty. The winter was so mild the ice did not solder, and was constantly moving south, hence its early appearance (February 22) along the southwestern coast of Greenland.

"Our ships have been trading to Ivigtut for the past eighteen years, and the mild winter and early appearance of the ice on the coast is a rare exception."

This would indicate an open season this summer, and it is to be hoped that the *Kite* will have little trouble in crossing Melville Bay. Her itinerary is about as follows:

Leave St. John's about July 1; reach Holsteinborg July 7 or 8, and pick up Professor Dyche; Godhavn about July 12, where a week will be spent among the glaciers. Leaving Godhavn about July 20, she should reach Inglefield Gulf and the Peary headquarters about July 27. Mr. Peary promised to be at the lodge not later than August 15. This interim will give the scientists an opportunity to make their studies and collections, which will be continued even after Mr. Peary's return until the end of August. Leaving Inglefield Gulf at the end of August, the *Kite* will steam slowly homeward, stopping at Cape York to take on the "ironstone," and at one or two of the Danish settlements, and reaching St. John's about October 1, where I shall await the arrival of the wanderers.

JOSEPHINE DIEBITSCH-PEARY.

WASHINGTON, June 21, 1895.

The following telegrams appeared in the *New York Times* of June 29 and the *Tribune* of July 9:

ST. JOHN'S, N. F., June 27.—The steamer *Portia* arrived to-night, bringing Messrs. Diebitsch, Salisbury, Walsh, and Le Boutillier, composing the Peary relief and Greenland scientific expedition. They expect to sail hence Monday or Tuesday, by steamer *Kite*. Considerable ice is reported north.

ST. JOHN'S, N. F., June 28.—The Peary relief expedition will not be able to sail hence before July 6. The steamer *Kite*, which will take the expedition to Greenland, cannot be made ready for the voyage before that date.

ST. JOHN'S, N. F., July 8.—Work upon the Peary expedition's steamer *Kite* is being continued rapidly. She is expected to sail to-morrow evening for Greenland.

Professor Salisbury, a member of the expedition, has just returned from an exploring trip through the interior of the island. He has acquired a large amount of information concerning the geology of the island, especially of the glacial period here.

SIXTH INTERNATIONAL GEOGRAPHICAL CONGRESS,

LONDON, 1895.

GENERAL ARRANGEMENTS FOR THE MEETING.

An Invitation Circular has been forwarded to the members of all the Geographical Societies in the world, and to many other persons likely to be interested in the approaching Congress. Through that circular the objects and general plan of the Congress have been made widely known, and copies may still be had on application to the Secretaries.

The following definite arrangements have now been made:

LANGUAGES.—It has been decided that in the meetings and discussions the English, French, German and Italian languages shall be on an equal footing. The abstract of each paper which is received by the Secretaries in time will be circulated before the meeting in the language in which it is written and in English. At the same time it is right to point out that in all congresses the number of members speaking and understanding only the language of the country has been far in excess of those conversant with several languages.

PLACE OF MEETING.—The meetings of the Congress will be held in the rooms of the Imperial Institute, South Kensington, London, S.W., a position easily reached from the South Kensington and Kensington High Street stations on the Underground Railway, and by omnibus from all parts of London. The privileges of honorary members of the Institute will be enjoyed by all members of the Congress, who will thus have the advantages of the free use of what is practically a high-class club with reading-rooms, smoking-rooms, dining-rooms and gardens.

OPENING MEETING.—The Congress will be opened in the great hall of the Imperial Institute on the evening of Friday, July 26, by H. R. H. The Duke of York, Honorary President of the Congress and of the Royal Geographical Society. Particulars of the meetings for the discussion of important geographical questions will be found in the preliminary programme to be issued before the meeting, and in the daily *Journal*.

HEADQUARTERS OF THE CONGRESS.—Until Thursday, July 25, the headquarters and offices of the Congress will remain in the house of the Royal Geographical Society, 1 Savile Row, London, W., where all information will be supplied, and tickets will be issued.

On Friday, July 26, the office of the Congress will be transferred to the Imperial Institute. If arrangements for hotels or for lodgings have not been made previously, members are recommended to leave their luggage in the "cloak room" at the railway station and come to the office of the Congress for information. Members of the Congress will enjoy the privileges of Fellows of the Royal Geographical Society from July 22d until August 10th, and the rooms of the Royal Geographical Society will be open as a rendezvous for members throughout the meeting.

HOTELS, ETC.—A list of hotels and boarding-houses, and of conveniently situated furnished lodgings will be placed in the office of the Congress, and assistance will be given to members in obtaining accommodation. If the amount and nature of the accommodation required are announced in advance to the Secretaries, much inconvenience would be saved to visitors.

EXHIBITION.—A Geographical Exhibition is being arranged by the Congress at the Imperial Institute. It will include a collection of historical maps, a representative exhibition of geographical instruments, both historical and of the most recent design, portraits of geographers and views of places, as well as special representative exhibitions prepared by the Geographical Societies of Berlin, Paris and St. Petersburg, and numerous exhibits from other countries, and from private persons.

TICKETS OF MEMBERSHIP.—In order to take advantage of the reduced fares offered by the railway companies (see below), the official Congress ticket must be produced when paying the fare. The subscription entitling a lady or gentleman to become a member of the Congress is £1 sterling, but members may procure additional tickets for ladies at the cost of 10s. each. The holders of these additional ladies' tickets (which are transferable to ladies) are associates entitled to all the privileges of members, except that they do not receive the Congress badge, have no vote in the meetings, and will not receive a copy of the report when published. The tickets of all members and associates who pay in advance will be forwarded to their addresses before the commencement of the Congress.

LETTERS TO MEMBERS.—Members and associates may have their letters addressed to them at "Geographical Congress, Imperial Institute, London, S.W.," where special postal facilities will be provided, and where members are urged to apply at once on their arrival. All invitations to receptions, etc., will be distributed in this way.

ADDITIONAL PRIVILEGES OF MEMBERS.—Members and associates of the Congress will enjoy the additional privileges of honorary members of the Royal Geographical Society, the Imperial Institute, and the Royal Colonial Institute during the meeting of the Congress. The Zoological Society has generously invited members and associates to visit the Zoological Gardens in Regent's Park, admission to which will be granted on presenting the Congress ticket at the gate. The Royal Botanical Society has also offered the free use of its gardens at the south end of Regent's Park to members and associates of the Congress on showing their tickets.

VOTES FOR THE CONGRESS.—Any member desiring to bring forward a resolution for discussion, and to be submitted by voting for the approval of the Congress, must furnish the same in writing to the Secretaries not later than July 1st. All resolutions received in this way and accepted as suitable for consideration will be printed and distributed to members, and the time for their discussion announced in advance.

BADGE.—A handsome badge has been designed, which will be given to each member of Congress on arrival in London, and will form a permanent souvenir of the London meeting. The badges of delegates of Governments and Societies will be silvered, those of ordinary members in bronze.

HANDBOOK TO LONDON.—Messrs. Thomas Cook & Son, the well-known tourist agents, will present a copy of their "Handbook to London" to every member of the Congress on arrival. This book contains a concise statement of all the principal places and sights of London, and full particulars as to railway stations, cabs, and omnibus routes. It is accompanied by maps, including a special map presented by Mr. Edward Stanford; and some pages of special descriptive matter compiled by the Secretaries of the Congress have been added.

RAILWAY ARRANGEMENTS.—Important concessions have been made by a number of railway companies to members and associates of the Congress. On the railways of Russia, Austria-Hungary, Switzerland and Holland, no reductions will be allowed; but by taking tickets to a station in Germany or France, near the frontier, reductions may be secured by visitors from those countries for the rest of their journey. In all cases it is necessary to produce the Congress membership ticket before receiving railway tickets at reduced rates. Persons desiring to take advantage of these concessions are therefore required to forward their subscriptions in advance. In the following list the countries most distant from London are mentioned first:

Italy.—Meridionale and Mediterraneo Companies, 30 to 50 per cent. reduction on ordinary fares according to distance traversed.

Germany.—An allowance of 50 per cent. will be made off the price of two single tickets for parties of thirty travelling together on outward journey by ordinary trains. No free luggage. It is suggested that arrangements should be made by the German Geographical Societies for allowing parties to meet and travel together from selected centres in order to take advantage of the reduced fares.

Belgium.—State railways allow 50 per cent. off price of two single tickets for parties of twenty members of any one particular Society travelling together on the outward journey. Valid for 30 days. For fares from Antwerp see English Railways.

Holland.—The Zeeland Steamship Company offers return tickets from Flushing to London at a single fare. Similar privileges are offered from Rotterdam and the Hook of Holland.

France.—The Western, Eastern, Northern, Southern, Paris, Lyons and Mediterranean, and Paris and Orleans lines will issue tickets at 50 per cent. reduction on two single fares. The Western and Northern companies will issue tickets at the reduced rates on the presentation of the Congress ticket. The other French companies require to receive in advance a list of members desiring to take advantage of the facilities they offer signed by the President of the Congress. Members of the Congress who wish to travel on these lines are therefore required to send to the Secretaries at 1 Savile Row, London, W., by July 1st, the name of the station of departure and of arrival on the lines in question, and an indication of the exact route. It is essential that the names of such members should be very distinctly written.

English Railways.—London, Chatham and Dover Company offers return ticket at single fare (plus 2s. 6d. pier dues at Calais) from Calais, available one month, or Flushing, available two months.

South Eastern Railway offers return tickets at single fares, from Calais and Boulogne (plus pier dues).

Great Eastern Railway offers return tickets at single fares, from Hook of Holland, Rotterdam and Antwerp.

London, Brighton and South Coast Railway allows 50 per cent.

off price of two single tickets in conjunction with the Western of France Railway.

Most of the railways will give return tickets for excursions from London at reduced fares, to places beyond a certain distance, during the meeting. Particulars will be published later.

STATION OF ARRIVAL.—Passengers travelling by the Great Eastern Railway arrive at Liverpool Street Station. Those coming by any other route from the Continent have a choice of two stations, one in the City, the other in the West End. The latter should be selected as being nearer the place of meeting. On the London, Chatham and Dover, and on the London, Brighton and South Coast Railways the West-End Station is Victoria, the nearest terminus to the Imperial Institute. On the South-Eastern Railway the West-End Terminus is at Charing Cross. Messrs. Cook's interpreters who meet the Continental trains will, if applied to, assist members of the Congress, whether they are travelling with Cook's tickets or otherwise.

EXCURSIONS IN LONDON.—Arrangements will be made for open coaches to leave the Imperial Institute every afternoon during the meeting of the Congress for drives in London and the neighbourhood. Each drive will last for two or three hours and will terminate at the Imperial Institute, and there will be a conductor on each coach who will explain all objects of interest on the way. It may be necessary to make a small charge to members and associates for the drive. Application for places should be made before 12 o'clock each day, and in case of there being an insufficiency of seats preference will be given to visitors from a distance. Details of the drives and of visits to the docks, to public buildings and places of industrial interest will be published in the full programme which will be given to members on their arrival.

ONE-DAY EXCURSIONS.—After the close of the Congress a series of excursions will be organized, for most of which the numbers will be limited. In some instances, the excursion may not take place, unless a sufficient number of members put down their names in advance. The deliberations of the Congress conclude on Saturday, August 3d, and an opportunity will be given to members to rest on Sunday; and on Monday, the 5th, to see one of the great public holidays when all work ceases, and the places of amusement and public parks are thronged by pleasure-seekers of the working class.

During the week ending August 10th, there will be excursions to Oxford, Cambridge, Windsor and Southampton (Ordnance Survey Office), leaving London in the morning and returning at night.

LONGER EXCURSIONS.—A two-days' excursion will start to Manchester and Liverpool on Wednesday, August 7th, and will be under the auspices of the Manchester and Liverpool Geographical Societies. The Manchester Geographical Society has intimated an intention of inviting a number of the most eminent geographers to be its guests on the occasion, but the excursion will be open to other members who may be prepared to make their own hotel arrangements in Manchester.

A limited excursion will also start for the English Lakes, under the guidance of Mr. J. E. MARR, F.R.S., a geologist who has made that district his special study. In order to fully appreciate this excursion, members must be prepared for a certain amount of walking. It will conclude on Saturday, August 10.

The Royal Scottish Geographical Society will receive the members of the Congress at Edinburgh, probably after the visit to Manchester, when Professor JAMES GEIKIE will conduct a geological and geographical excursion in the neighbourhood of Edinburgh. This will be followed by a physico-geographical excursion to the Scottish Highlands, of a week's duration, which will be under the guidance of Mr. H. M. CADELL, formerly on the Geological Survey of Scotland. If a sufficient number of members desire it, excursions of a week's duration will be conducted to Wales and to Ireland. It is requested that members wishing to take part in the longer excursions should give notice of their intention to the Secretaries as soon as possible.

BRITISH ASSOCIATION.—The meeting of the British Association for the Advancement of Science takes place this year at Ipswich, from the 11th to the 18th of September. Foreign members of the Congress who intend to remain for this meeting, are requested to send their names as soon as possible to "The Recorder, Section E (Geography), British Association, Burlington House, London, W."

ENTERTAINMENTS.—During the meeting of the Congress there will be many entertainments in the form of receptions, dinners, afternoon and evening parties, for which special invitations will be sent to members and associates of the Congress. In most cases the number to be entertained is limited, and it is desirable that the Secretaries should have as complete a list of members as possible to submit to the hosts. Among the arrangements which have been made are receptions by the President of the Congress, Mr. C. R. Markham, the Earl of Northbrook, the Baroness Burdett-Coutts, the Right Hon. Sir George Bowen, the Hon. George N. Curzon, the Astronomer Royal at Greenwich Observatory, Mr. Thiselton-Dyer, Director of the Royal Gardens at Kew, and Mr. G. Cawston. One reception at least will be held in the Imperial Institute Others will probably be announced later.

Arrangements will probably be made by which a special room at the Imperial Institute will be reserved each evening for members and associates of the Congress to dine together at a moderate cost.

Full details as to excursions and other arrangements will be obtainable by members on arrival in London.

PROVISIONAL PROGRAMME OF MEETINGS.—On Friday, 26th July, the Congress will be opened in the Great Hall of the Imperial Institute at 9 P.M., when short addresses of welcome will be delivered by H. R. H. The Duke of York, Honorary President, and by Mr. Clements R. Markham, President. A Conversazione in the rooms and gardens of the Imperial Institute will follow.

On Saturday, 27th July, Mr. Markham will deliver his Inaugural Address in the Great Hall at 10 A.M., after which the Congress will meet in two sections to discuss papers on *Geographical Education*, by Professors Levasseur and Lehmann and others, and on *Mathematical Geography*, especially the use of photography in surveying, by Colonel Laussedat, Colonel Tanner and others.

No meetings will be held on Sunday, but many members will doubtless take advantage of the opportunity to visit the Zoological Gardens in the afternoon.

On Monday, 29th July, a general meeting of the Congress will discuss the subject of *Arctic and Antarctic Exploration*, introduced by Professor Neumayer and Admiral A. H. Markham. In the afternoon two sections will be formed, in one of which questions in *Geodesy* will be treated by General Walker and M. Lallemand, while in the other papers will be read by Prince Roland Bonaparte on *Glaciers*, and M. Martel on *Speleology*.

On Tuesday, 30th July, report of committees and papers on the proposed *Map of the World* on the scale of 1:1,000,000, and on *International Geographical Bibliography*, will be presented at the general meeting, and two sections will then deal with *Oceanography*, and with the *Orthography of Place Names*.

On Wednesday, 31st July, Sir John Kirk will initiate a discussion on *Europeans in Africa* in the general meeting, and in the afternoon the sections will consider *Applied Geography* (Commercial Geography) and *Limnology*, the latter to be introduced by Professor Forel.

On Thursday, 1st August, the general meeting will deal with the *Terminology of Land Forms*, and in the afternoon *Cartography* and other subjects will be treated.

On Friday, 2d August, the forenoon will be devoted to papers by Baron Nordenskiöld, Professor Hermann Wagner, and others, on the *History of Maps*, and all the remaining papers will be taken in the afternoon.

On Saturday, 3d August, the votes proposed for consideration will probably be discussed, the date and place of meeting of the next Congress considered, and the President will deliver his concluding address.

The foregoing is a purely provisional programme in which only a few of the promised papers are mentioned, and while, in its main features, it will probably be adhered to, the details may be changed. A detailed programme will be distributed on the opening day, and full particulars of each day's proceedings, both at the Congress meetings and in excursions and entertainments, will be given in the Congress *Journal*, which will be distributed each morning.

ACTING OFFICERS OF THE CONGRESS.

President.—Clements R. Markham, C.B., F.R.S.

Vice-Presidents.—To be appointed at the meeting.

Chairman of Committees.—Major L. Darwin, R.E., M.P.

Secretaries.—J. Scott Keltie, Hugh Robert Mill.

Secretaries for Exhibition.—John Coles, E. G. Ravenstein, John Thomson.

Secretaries for Receptions.—Sir Clement Hill, K.C.M.G., E. Delmar Morgan.

Assistant Secretaries During Meeting.—J. Theodore Bent, Miss Cust, G. G. Chisholm, B. V. Darbishire, H. N. Dickson, E. Heawood, A. J. Herbertson, H. Yule Oldham, H. S. Schlichter, A. Silva White.

GOVERNMENT DELEGATES.

France.—M. le Colonel Bassot, de l'Institut (War Department); M. Bouquet de la Grye; M. le Prof. Henri Cordier; M. le Prof. Hamy, de l'Institut; M. le Prof. Émile Levasseur, de l'Institut; M. Charles Maunoir; M. Perin; M. Schéfer (Education Department); M. Camille Guy; M. Marcel Dubois (Colonial Department).

Austria.—Herr Vinzenz Haardt von Hartenthurn; Herr Dr. Oskar Lenz; Herr Prof. Dr. A. Penck.

Hungary.—Dr. Albert Erödi; Prof. Ludovic Lóczy; Prof. Dr. Arminius Vámbéry.

Italy.—Colonel Louis Gilletta (War Department).

Sweden and Norway.—Dr. Johan Arvid Kempe; Dr. Otto Pettersson.

Netherlands.—Count O. J. H. van Limburg Stirum.

Belgium.—M. le Comte Goblet d'Alviella; M. de Ceuleneer; M. Jules Leclercq; M. Léon Leclère.

Portugal.—Senhor Conselheiro Francisco J. Ferreira de Amaral; Senhor Luciano Cordeiro; Commander Ernest de Vasconcellos.

Switzerland.—Herr Prof. Dr. E. Brückner; M. le Prof. Raoul Gautier; Herr Nationalsrath Dr. A. Gobat.

Turkey.—Numan Kiamil Bey; Colonel Riza Bey.

United States.—W. W. Rockhill, Esq.

Mexico.—Don Enrique L. Gonzalez; His Excellency Don Cayetano Romero.

Argentine Republic.—Dr. Luis M. Dominguez (Geographical Institute).

Chile.—Dr. Eduard Moore.

Queensland.—Sir James F. Garrick, Q.C., K.C.M.G.

Tasmania.—Sir James A. Youl, K.C.M.G.

South Australia.—Hon. Thomas Playford.

Western Australia.—Sir Malcolm Fraser, K.C.M.G.

Cape of Good Hope.—Abraham de Smidt, Esq.

DELEGATES FROM GEOGRAPHICAL SOCIETIES.

Société de Géographie, Paris (founded 1821).

Delegates—Prince Roland Bonaparte; Comte Henri de Bizemont; M. le Prof. Henri Cordier; M. le Prof. Hamy, de l'Institut; M. le Baron Hulot; M. le Prof. Albert de Lapparent; M. le Prof. Émile Levasseur, de l'Institut; M. Willy Léwy d'Abartiague; M. Charles Maunoir.

Gesellschaft für Erdkunde, Berlin (1828).

Delegate—Herr Prof. Dr. Karl von den Steinen.

Royal Geographical Society, London (1830).

Represented by the Officers of the Congress.

*Norske Geografiska Selskab, Christiania (1839).
Delegate—Dr. Yngvar Nielsen.

Imperial Russian Geographical Society, St. Petersburg (1845).
Delegates—M. le Général Annenkoff; M. le Professeur Anuchin; Dr. A Grigorieff; M. Grum-Grijimailo; M. Radloff; M. Raïevsky; M. Semionoff; M. Shokalsky; M. Struve; M. Chihacheff; M. le Baron Toll; M. le Baron Trobenberg; M. le Baron Wrangel.

American Geographical Society, New York (1852).
Delegates—Hon. Charles P. Daly, LL.D.; Wm. Libbey, Jun., Esq., D.Sc.

K. K. Geographische Gesellschaft, Vienna (1856).
Delegate—Chevalier Ernst von Hesse-Wartegg.

Société de Géographie, Geneva (1858).
Delegate—M. le Prof. Raoul Gautier.

Verein für Erdkunde, Leipzig (1861).
Delegate—Dr. Hans Meyer.

Geographische Gesellschaft, Munich (1869).
Delegates—Prof. Dr. S. Günther; Prof. Dr. E. Oberhummer.

Geographische Gesellschaft, Bremen (1870).
Delegate—Herr Dr. M. Lindemann.

Magyar Földrajzi Társaság, Budapest (1872).
Delegate—Dr. Bela Erödi.

Magyar Tudományos Akadémia.
Delegates—Dr. Arminius Vámbéry; Prof. Ludovic Lóczy.

Sociedade de Geographia de Lisboa (1873).
Delegate—Senhor Luciano Cordeiro.

Geographische Gesellschaft, Bern (1873).
Delegates—Herr Nationalsrath Dr. A. Gobat; Herr Prof. Dr. E. Brückner.

Koninklijk Nederlandsch Aardrijkskundig Genootschap, Amsterdam (1873).
Delegates—Prof. Dr. C. M. Kan; J. Æ. C. A. Timmerman; H. D. J. Maas.

Société de Géographie, Lyons (1873).
Delegate—M. J. Cambefort.

Sächsisch-Thüringischer Verein für Erdkunde, Halle (1873).
Delegate—Herr Prof. Dr. A. Kirchhoff.

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* The position assigned to this Society seems to be due to a printer's error in the *Geographisches Jahrbuch, Bd.* xiv, *S.* 469. The Norse Geographical Society was founded not in 1839, but in 1889.—Ed. Bulletin.

Société de Géographie Commerciale, Paris (1873).
Delegates—M. le Prof. Marcel Dubois; M. C. Gauthiot; M. le Prof. E. Levasseur, de l'Institut; M. Lourdelet; M. Méjemont; M. le Prof. O. Noel; M. Ravencœur; A. Vandendriesche, Esq.; M. H. de Vérigny.

Geographische Gesellschaft, Hamburg (1873).
Delegate—Herr L. Friederichsen.

Sociétatea Geografica Romana, Bucharest (1875).
Delegate—M. Georges T. Lahovary.

Société Khédiviale de Géographie, Cairo (1875).
Delegate—Dr. Abbate Pasha.

Sociedad Geografica de Madrid (1876).
Delegate—Excmo. Sr. D. Francisco Coello y Quesada.

Société Royale Belge de Géographie, Brussels (1876).
Delegate—M. le Prof. J. Du Fief.

Société de Topographie de France, Paris (1876).
Delegate—M. Ludovic Drapeyron.

Société Royale de Géographie, Antwerp (1876).
Delegates—Lieut.-Gen. Wauwermans; M. Jan Langlois.

Société de Géographie, Marseilles (1876).
Delegates—M. A. Breittmayer; A. Garsin; M. Jacques Léotard; M. A. Janet.

Svenska Sällskapet för Antropologi och Geografi, Stockholm (1877).
Delegates—Herr S. A. Andree; Prof. Dr. August Wijkander.

Centralverein für Handelsgeographie, Berlin (1878).
Delegate—Dr. Carl Dunker.

Société Languedocienne de Géographie, Montpellier (1878).
Delegate—M. Casimir Maistre; M. Fabvre.

Société de Géographie de l'Est, Nancy (1879).
Delegate—M. le Prof. J. Thoulet.

Société Normande de Géographie, Rouen (1879).
Delegates—M. le Dr. Louis Boucher; M. Gabriel Gravier; M. Prosper Guernet; M. Alfred Raver; M. Gaston Routier.

Société de Géographie, Rochefort (1879).
Delegate—M. Daniel Bellet.

Union Géographique du Nord de la France, Douai (1880).
Delegate—M. le Prof. Henri Cons.

Geographical Society of the Pacific, San Francisco (1881).
Delegate—Chevalier Ernst von Hesse-Wartegg.

Société de Géographie de Lille (1882).

Delegates—Eugène Delessert; M. O. Godin; M. François Masural.

Geographische Gesellschaft, Königsberg (1882).

Delegates—Prof. Dr. Prutz; Dr. Lullies; Prof. Dr. Hahn.

Württembergischer Verein für Handelsgeographie, Stuttgart (1882).

Delegate—Freiherr Franz von König-Fachsenfeld.

Geographische Gesellschaft, Greifswald (1882).

Delegate—Prof. Dr. Rudolf Credner.

Société de Géographie, Toulouse (1882).

Delegate—M. le Dr. de Rey Pailhade.

Sociedade de Geographia de Rio de Janeiro (1883).

Delegates—M. le Baron de Rio Branco; Baron de Sant' Anna Nery; Dr. Robert H. Gunning.

Royal Geographical Society of Australasia, Sydney Branch (1883).

Delegates—The Earl of Jersey; E. Delmar Morgan, Esq.

Royal Scottish Geographical Society, Edinburgh (1884).

Delegates—Professor James Geikie, LL.D., F.R.S.; Lieut.-Col. Fred. Bailey.

Manchester Geographical Society (1884).

Delegate—Rev. S. A. Steinthal.

Mittelschweizerische Geographisch - kommerzielle Gesellschaft, Aarau (1884).

Delegate—Herr Karl Buhrer.

Royal Geographical Society of Australasia, Brisbane Branch (1885).

Delegate—Dr. Hugh Robert Mill.

Tyneside Geographical Society, Newcastle (1887).

Delegate—G. E. T. Smithson, Esq.

National Geographic Society, Washington (1888).

Delegates—Cyrus C. Adams, Esq.; Hon. W. T. Harris; Hon. Gardiner G. Hubbard; Crosby Noyes, Esq.; Miss Eliza R. Scidmore.

Geographical Club of Philadelphia (1892).

Delegates—Henry G. Bryant, Esq.; Charles H. Hutchinson, Esq.

Liverpool Geographical Society, Liverpool (1893).

Delegate—Staff-Commander Dubois Phillips, R.N.

Geographical Association for Improving the Teaching of Geography in Schools, London (1893).
Delegate—B. Bentham Dickinson, Esq., M.A.

The following have been intimated too late for classification:

Sociedad Mexicana de Geografia y Estadistica, Mexico.
Delegate—Don Cayetano Romero.

Verein für Geographie und Statistik, Frankfurt a. M.
Delegate—Herr Rudolf Stern.

Asiatic Society of Japan, Tokio.
Delegate—F. V. Dickins, Esq.

Böhmische Gesellschaft für Erdkunde, Prag.
Delegates—Prof. Dr. J. Palácky; Prof. Dr. F. Metelka.

Brooklyn Institute of Arts and Sciences, Brooklyn.
Delegate—Cyrus C. Adams, Esq.

Société d'Archéologie de Bruxelles, Brussels.
Delegate—M. Louis Paris.

Ostschweizerische Geographisch-Commercielle Gesellschaft, St. Gallen.
Delegate—Herr Prof. Amrein.

Société des Études Coloniales et Maritimes, Paris.
Delegates—M. Bouquet de la Grye; M. Victor de Ternant.

Sociedad Geografica de Lima.
Delegate—Sr. D. Federico Alfonzo Pezet.

Società Africana d'Italia, Naples.
Delegate—Signor Capitano Matteo Grixoni.

BULLETIN

OF THE

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STAMPEDE PASS, CASCADE RANGE, WASHINGTON.

BY

VIRGIL G. BOGUE.

The main obstacle to the construction of the Northern Pacific Railroad was the densely wooded Cascade Range of mountains, which extends through Oregon and Washington, a hundred and fifty miles from the Pacific shore. Prior to 1854 these wilds were but little known to white men, their rugged character and the heavy forest growth which covers them forbidding the use of saddle animals and making their exploration a difficult and dangerous undertaking. In that year, however, efforts were made to find a railway route across them by the then Capt. Geo. B. McClellan, under orders from the War Department, Isaac I. Stevens, the Governor of Washington Territory, having general oversight of the expedition, whose results are detailed in the Department Reports of 1854 and 1855. Nothing more was done worthy of mention until 1867. The Northern Pacific then began explorations and surveys, under its charter authorizing the construction of a line from Lake Superior to Puget Sound, north of the 45th parallel, and with a branch to Portland, Oregon, *via* the Columbia River, from a point not more than three hundred miles from the coast. These expeditions, occurring at intervals during thirteen years, had varying success, the engineering parties being often forced through severe weather and failing supplies, to return to headquarters with but meagre information.

Nevertheless, much was learned of the general character of the mountains and their possibilities; enough to convince the company that the difficulties of construction would be great, and that no selection of a route should be made until every part of the range had been explored. These facts diverted attention for a time to the Columbia

River branch, as the more promising immediate undertaking. Matters drifted along, however, until 1880, when the success of the Company in raising funds to push construction west of Bismarck (the terminus since '73,) made it imperative that the route be definitely located. By this time the Oregon Railway and Navigation Co. had commenced building from Portland along the Columbia River, having in view two objects, one, to reach the wheat fields of Eastern Oregon and Washington, and the other, the construction of a line that might become the Pacific Coast outlet and connection for both the Northern Pacific and Union Pacific, the latter company having begun the construction of its Oregon Short Line, with the purpose of extending it through to the coast.

The Northern Pacific, finding its route for the Columbia River branch thus occupied, was forced to decide upon a line across the Cascade Mountains to Puget Sound. With this in view further explorations of the range between Mt. Adams and Snoqualmie Pass were begun under the direction of Col. Isaac W. Smith, with the title of Engineer Cascade Division Surveys, the objective point at tide-water being Tacoma.

For this undertaking the old Indian trails, or what remained in one case of an attempt at a waggon road, were cleared as required; and some new ones built. Thus roads for pack animals were secured through a few known passes, from which explorations were extended in any direction, as the situation demanded. Such explorations were the work of small parties of four or five men, carrying their outfits on their own backs, each party being in charge of an experienced engineer. They lasted days or weeks, according to the state of supplies or the progress attained. As snow does not quite disappear on the divide before July, snow-shoes were in many cases a necessity.

Toward the close of the same year a fair knowledge had been gained of the entire range from Mt. Adams to Mt. Baker, excepting the part about the headwaters of Green River. This stream, from its sources to within a few miles of Puget Sound, was still unknown. Its lower reaches, for twenty miles west of the foot-hills, were in a crooked coulee, one hundred to three hundred feet in depth, through which it rushed in cascades and rapids and among large rocks and tree-jams. The forests once occupying the bench lands on either side of this coulee had been, at some remote period, devastated by fire, causing the disappearance of the smaller trees and leaving the charred remnants of the larger ones strewn upon the ground in masses and windrows. A dense growth of fir brush, from twelve to forty feet in height, had succeeded, which in turn had been in places much bent over and broken down by the weight of heavy snows. These conditions were noticeable along a belt some miles in width, at the base of the foot-hills, from White River to Snoqualmie River, but were especially marked where Green River breaks out of the mountains. They also extended eastward among the hills and along the streams. Besides, there were large and impassable swamps, particularly in the region between White and Green rivers.* On the southwestern border of this wilderness lived the tribe of Muckleshoot Indians, but there were no white men except two settlers, Geo. W. Vanderbeck and James McClintock. The Indians had a story that some of their number once crossed the jungle described, reaching Mt. Enemclaw, a great cliff at the base of the foot-hills. But beyond that point no living Indian had ever penetrated. There was, however, a tradition of a trip made by one of their ancestors to the head waters of Green River, where he found a pleasant country and good fishing.

As operations in other parts of the mountains proceeded, the possibilities of the Green River region became a matter of growing interest. It was remarked that no high peaks seemed to rise in that part of the range which the river drained; and that, even after prolonged rains, the water at its mouth was comparatively clear. We, therefore, concluded it must flow through a country where landslides were infrequent and where, consequently, a railway would occupy safe ground.

It was finally decided to have the mysteries of this region cleared up, and, as a beginning, Mr. J. Tilton Sheets, an engineer well qualified for such work, was sent to explore the main divide at the head of Green River. With his base of supplies at Thorp's Cabin, a deserted log hut on the Yakima River, east of the range, three and one-half miles below the present railway station of Easton, he discovered two passes at the head of the main fork of Green River, one of which he called *Tacoma Pass* and the other *Sheets Pass.* He did not explore about the head of the north fork, but concluded to descend the river to its mouth and report in person at Tacoma. This he succeeded in doing in a trip of some days' duration, although his supplies ran short and the party suffered great hardships, arriving on Puget Sound worn out and nearly starved.

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* These two streams receive their names from their marked colour. That of the first is due to the glacial origin of some of its tributaries, which head in Mt. Rainier; that of the second, to the colour of the rocks and boulders over which it flows.

While Mr. Sheets' principal object shortly became that of saving the lives of himself and men, he was pleased with the topographical features of the country, so far as observed, and made a favorable report, particularly of Tacoma Pass. This was in October. Returning to Thorp, *via* Portland and The Dalles, on the Columbia River, with a full party for instrumental work, he was followed by Col. Smith, who personally directed the running of levels from Thorp to Tacoma Pass, and the building of four cabins for the use of engineering parties in the following spring. These cabins were located at intervals of about five miles. Taking Tacoma Pass as a starting point, one of them was four miles westward, on the main fork of Green River, and the other three on Cabin Creek, which heads in the pass and flows eastward into the Yakima. These were named Cabins 1, 2, 3 and 4 respectively, No. 1 being near the mouth of Cabin Creek, not more than six miles above Thorp. Operations were now suspended on account of the heavy and continuous snow storms of December, the party descending the Yakima and separating at The Dalles. Four men, however, were left on the upper Yakima, two at Ellensburg to care for the stock, and two at Thorp to take charge of supplies and await orders.

Two months previously, I had been instructed to proceed to Spokane Falls, then a little settlement of three to four hundred people, and, with a party organized there, to explore the Cœur d'Alêne* range, from the pass crossed by the Mullan waggon trail, northward, toward Pend d'Oreille Lake.† My return from this exploration was made *via* Walla Walla and Portland. I reached Tacoma December 27th, meeting instructions from Col. Smith to make a reconnoissance of the Cascade range between Tacoma Pass and the head of Cedar River, in order to cover the still unexplored region about the headwaters of Green River. I was also to make such surveys of the several Green River passes as might seem advisable.

The work, this time, was to begin from the west side, by cutting a trail across the jungle to Green River, thence moving on up the stream, till stopped by deep snows. Here a base of supplies could be located, progress beyond to be made on snow-shoes. With the help of John D. McAllister, the efficient commissary, our preparations were soon made and I found myself, on January 17th, at the ranch of James McClintock, one of the settlers mentioned. Here was to be the base of supplies, which could be reached by waggon. My party, all skilful woodsmen, had preceded me some days and already cut their way into the jungle several miles. We were well equipped with axes, brush-hooks, saws, camp outfit, and a pack train of *cayuse* ponies.

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* When the French Jesuits, among whom was the famous *Père De Smet*, undertook the conversion of the natives of this region, they found them intractable and difficult to instruct in religious matters; and, from this characteristic, named them *Cœur d'Alêne* Indians, and the range of mountains as well, the *Cœur d'Alêne* (The heart of an awl).

† *Lake Pend d'Oreille* was so named by the early French Jesuits from its resemblance in shape to a long ear-ring. It is verily a gem in a mountain setting.

We continued the trail-cutting and building without delay, the exploration and tree-blazing, which should indicate the route, naturally falling to my lot, as the head of the expedition. Usually one man accompanied me to provide against accidents. A generally easterly course, towards Mt. Enemclaw, was at first selected; but, as we neared the foot-hills and occasionally gained a point whence they could be seen, the direction was gradually changed to a more northerly one. We soon found that exploration for this trail was a serious matter. Swamps and hollows impeded our progress, and we had to force our way through fir thickets and over fallen tree-trunks of great size. There were many places where the undergrowth had been bent down by snow, to a nearly horizontal position, forcing us to a choice between scrambling or walking over, or crawling under on all fours. We had many falls, and were soon black and blue about the arms and legs. Often at night, when worn out by a day of such toil, bruised, scratched and sore, and soaked to the skin, our reflections were such as would hardly bear publication.

As usual, in winter, the rain fell in torrents much of the time, forming morasses across our route, where, at another season, few would have been found. After having cut out the trail through the tangled masses of forest débris, the party was, therefore, frequently obliged to return and lay corduroy, or build rough bridges of cedar puncheons to afford footing for the ponies. While we made many detours to avoid labor, kept the camp well toward the front, and gradually increased the size of the party until forty or more well equipped men were employed, our progress was exceedingly slow. Some days, the impediments were so numerous that not more than fifteen hundred feet of actual advance could be made. Still, believing that our course ought to intersect Green River within a distance of twenty miles from McClintock's, and that, once there, we could perhaps get on faster; and, animated by an ambition to open a road across the jungle that had hitherto kept the Green River Water Shed tightly sealed against the intrusion of mankind, we let no day go by without adding to the length of finished trail. One evening, I returned to camp with the news that during the day I had climbed to the summit of a high ridge, undoubtedly part of a spur which, followed, would have led me down to Green River. Also, that from this ridge, looking eastward, I could see far into the mountains, along the break formed by the course of the stream. On January 26th, but a few days after this, we reached Green River at a point about forty-four miles from Tacoma, by the existing railway, twelve in a direct line from McClintock's, or sixteen, following the sinuosities of the trail.

We now hoped to make more rapid progress, but found ourselves in a canyon, along whose rocky slopes the work was even more arduous than before, every step of advance being met by some new difficulty, to which rapidly deepening snow was soon added. It rained or snowed almost constantly.

Before February, many of the men weakened, compelling me to relieve them; but, as their places were promptly filled, this caused no serious delay. Experience with other streams of the range had taught me that the canyon we were in would not be many miles long, and that, beyond it, we should probably find bottom lands on one or both sides of the river. And so it proved; for on February 8th, we reached a large tributary on whose border we camped, finding the canyon beyond much less pronounced. At this point occurred the first forest of good timber. The snow, now two or three feet deep, forced us to stop all trail-cutting for the time, and to locate here the base of supplies for an advance on snow-shoes. This was Camp 7, where we remained until the 14th, improving the trail behind us, and building a log cabin and shed. We also commenced the construction of a canoe for boating supplies farther up Green River, but soon abandoned it, because a little exploration disclosed many rapids and tree jams in the stream above. This circumstance, however, gave the name to both stream and camp, which were thereafter known as Canoe Creek.

Leaving some of the men behind to resume the cutting of the trail as the snow should permit, I started on, with those best fitted for my purpose; a part of them bearing packs on their backs, the others hauling loads on sleds, and all travelling on snow-shoes. Our progress across ravines, projecting spurs and swamps, through brush and over fallen trees, was slow and exasperating. Occasionally a man would go half out of sight in some cavity beneath the snow, or stumbling, roll down a slope until stopped by bushes or logs. As all were equally liable to these mishaps, no ill feeling was caused by the laughter that greeted their occurrence.

The sleds, an importation from British Columbia, where they are much used by voyageurs and prospectors, proved hardly satisfactory, on such rough ground. They were often bottom up, and, in getting over many places, only furnished an additional burden for the men to carry. However, before night, we reached a place already selected by previous exploration, suitable for a cache. This was about five miles from Canoe Creek by our trail, and at the mouth of a brook some twenty feet wide, which became known as Cache Creek. The next morning, we cached some of our supplies, and I detached several men from the party to bring more from Canoe Creek, until a certain quantity was accumulated. By this time, they would get word to follow on with provisions to some other camp indicated by me, in order to prevent detention of the leading party by lack of food. A party following could always overtake the one ahead, its road being already marked out by the latter, which lost much time in waiting for explorations to determine its route.

In making further advance, we encountered the usual difficulties, and in addition to them the necessity of crossing the river, a most difficult accomplishment at that time. This we were forced to do, because of a precipitous mountain, which obstructed our progress on the south side, where we had hitherto held our way. But, on the evening of the 19th, we camped in the canyon about one mile above the present railway station of Eagle Gorge, on the north bank. This was Camp 10, the distance from Tacoma by present railway line being fifty-one miles. And now began a rain which lasted, with practically no intermission, for four days, filling all the streams and gullies, and causing the river to rise to a height I had not supposed possible. Our bridge, which consisted of two great foot-logs, one across a slough and the other across the main channel of the river, was threatened, but fortunately held its own. During these days all we could do was to remain in camp, keeping up the fires and speculating on the doings in the camps below and our chances ahead. On the morning of the 24th, the cessation of rain permitted a resumption of our efforts. We had not gone far when the fog, which had shrouded us, suddenly lifted, revealing a comparatively open space, on which the sun shone brightly, bringing courage and hope to our spirits, depressed by recent experiences.

Just at this moment we caught sight of a large eagle, flying about in widening circles, directly above our heads. This appearance, which seemed to all a good omen, furnished a timely suggestion as to a name for the canyon we were leaving; and ever since it has been known as Eagle Gorge.

Progress continued slow and laborious, the principal obstacles now being the sloughs and channels which frequently cut through the bottom lands. Accumulations of driftwood, the dense undergrowth and the soft snow, liable to give way at any moment, precipitating one into a pool of ice-cold water, added not inconsiderably to our annoyances. But on March 2d we reached Camp 13, among a number of fir trees of immense size, and about a mile above a stream called, by the two Indians of the party, Smay Creek.

This point is sixty miles from Tacoma by the present railway.

Meantime, although our supplies had been replenished from Cache Creek, the outlook was not encouraging; for, with a party of ten, provisions disappeared rapidly. All had suffered greatly from exposure and labour under such unfavorable conditions, and were discouraged. But, some time previously, I had learned from Col. Smith that the two men at Ellensburg were to go on to Thorp, and, with those remaining there, convey such supplies as they could pack on their backs across Tacoma Pass, going from cabin to cabin until they reached Cabin 4; thence on as far down Green River as possible, where they were to build another cabin (Cabin 5), and try to make connection with us.

In view of this fact and our present plight, and believing that if these instructions had been executed we could not be many days' journey from Cabin 5, I decided, before we again sought the repose of our blankets, to push on with only three men, and make a spurt that should hurry the expedition to a conclusion. Accordingly, all hands were called out early the morning of the 3d. From among them I selected one as foreman and put him in charge of operations between Canoe Creek and Smay Creek, with orders to have more provisions packed up to the latter camp, those at the former being replenished from time to time by the Commissary.

The men were then named to accompany me, the principal one being Joseph Wilson, a Canadian voyageur and prospector about fifty-five years of age. An accomplished woodsman, he had a physique that endured any hardship, and was withal intelligent and kind-hearted. The others were Indians, Peter and Charley. Our outfit, which was as light as we dared make it, consisted of one or two blankets each, besides our rubber blankets, a small fly, a frying pan, tin-kettle and coffee-pot, and a few provisions, principally flour, baking powder, beans, bacon and coffee.

We parted from the others and soon lost sight of them. Our progress being slow and difficult, we took to a ridge which we thought might parallel the course of the river and afford us a more rapid and certain route. But after some time we found ourselves getting farther and farther away from the stream, and were obliged, with what speed we could make, to again descend towards the river bottoms. In this way little direct progress was made that day, and we encamped at night in a hollow of the hillside above some warm springs, which have now become well known, being near the present railway station of Hot Springs, sixty-two miles from Tacoma. The next morning our route lay among large fir trees on the north side, where the accumulations of snow covered so much of the forest débris as to permit faster travel on snow-shoes than had hitherto been possible.

At noon, when we had stopped to make coffee, it was thought best to send back the two Indians, who, by remaining with us, would soon demolish our small stock of provisions. I therefore told them to return to Smay Creek, get more supplies, and then follow on our trail until they should overtake us, wherever that might be. Wilson and I pressed on, making camp (15) at a late hour near the mouth of what seemed to be a slough of Green River. We concluded we must be near Cabin 5, and that the following day we should keep a sharp lookout for any sign of white men. But, in spite of diligent search, no trace of our friends appeared along our route, which had been as close to the stream as the undergrowth permitted, in order to discover any large fork coming in on the south. If one became visible, the plan was to cross and explore it for some distance at least, with the hope that it might be the main stream, where would be found some sign of those we sought. The view, however, was much obstructed, the south side appearing, in occasional glimpses, steep and forbidding, while on the north there was little to oppose our progress in the open forest. We were moving on the line of least resistance.

Toward night we camped in the angle between two creeks, each about fifty feet wide, which united to form the stream that had been our guide through the day. Some further search was then made, but without result, excepting a full consideration of our situation as we sat by the evening camp-fire. We were certain that no large fork had been passed on the north side since leaving Smay Creek; a fact leading plainly up to the inference that one of the two creeks meeting at our camp must be Green River proper, while the other was its north fork; that is, unless our keeping to the north side had lost us the main stream altogether in the dense forest. Although the latter supposition appeared, after all, the correct one, we did not like to abandon our position without exploration of the two streams mentioned. The north fork, reported to have been seen by Mr. Sheets, might be one of these creeks; or, possibly, the one we had been following during the day, or even some other stream yet to be discovered. Green River was, doubtless, made up of several tributaries coming in from the main and lateral divides. We were among forest-covered mountains, permitting no view that might settle the vexed question of the location of the main water-course and its north fork. The only plan, therefore, promising success was to examine everything as we went along, and to do this most thoroughly we must make a laborious ascent of the hillside opposite on the north, follow its slope around eastward, and, finally, toward the south, crossing the creeks higher up between the camp and the divide. This would take us over many ravines and ridges, but would insure our crossing the trail of our friends, if it lay along any of the water-courses found. But, in spite of our hopes, the two days thus consumed seemed lost, so far as any clue to the whereabouts of the other party was concerned, and we became satisfied that the search must be made elsewhere. However, it appeared best to put in another day here and thus make this presumption a certainty.

We had to endure constant discomforts caused by the weather and our situation, not the least of which was the effort to dodge the masses of soft snow falling at intervals from the trees while we were on the march. But even with our fatigue and the annoyance caused by a growing belief that we had struck the wrong track and had thereby lost several precious days, there came to us a determination to see our mission through, at whatever cost of trouble or hardship.

And, to speak without exaggeration, matters were becoming somewhat serious. Our supplies, scant enough at first, be it always remembered, on account of the difficulty of transportation, were now nearly gone, and there was no present assurance of more under existing circumstances. For the finding of the other party had, through our mishap, become a very uncertain matter, and on the Indians, we feared, there could be placed but little dependence. Hence it appeared necessary to at once do something to help ourselves. Wilson then proposed to return alone to Smay Creek, or till he met the Indians, and take from them the provisions, while they turned back to procure more. His proposition meeting my approval, he started out with a small pack early on the morning of March 7th, expecting to be gone two days.

Being left alone, I continued the unfinished work of the day before. Climbing the spur behind the camp, I struck out along a ridge towards the main divide and consumed a good part of the day in fruitless examinations. There was nothing to indicate that any man had ever preceded me here. But, on my return, when about a mile from camp, and retracing my path of the morning, I came upon the footprints of a wolf. The creature had crossed the ravine from the north, and, on meeting my tracks, had turned and kept along them toward camp. I had seen but few signs of animals for weeks, and was quite unprepared to find these now, fresh and clean cut, on the white snow, leading in that particular direction. But Mr. Wolf must have changed his apparent intention of raiding our ill-stocked larder, for his path soon left mine, turning down a slope and into a ravine on the south. As there still remained somewhat of daylight, I passed beyond the camp along the creek to the northeast, more to see the fine fir trees than for any other purpose. In a few moments there appeared more footprints; this time those of a big bear, partly obliterated by recent snow-falls, and about a hollow tree, which had evidently been his winter quarters. He must have been out a few days before, but, not satisfied with the weather, had returned to sleep the rest of the season.

In the lengthening shadows, I prepared a solitary supper, and ate it without my usual appetite, and as quietly as possible. Sitting by the fire thinking over my situation, I realized that it was somewhat dangerous, especially as I supposed Wilson to be fifteen or twenty miles away. Fire-arms there were none, except my revolver, which could hardly be taken into account, not having been discharged for months. But the reflection, that never in my own experience, had I known harm to come from wild beasts, greatly served to still my fears, already partially lulled by Nature's potent soporific, fatigue. I therefore crawled into my blankets and composed myself for sleep, in the best manner possible under the circumstances.

I had become fairly tranquil, speculating dreamily on the probability of an awakening before morning caused by the howling of wolves, or by the intrusion of a bear's snout among my blankets, when roused to an acute perception of surrounding things. A sudden loud snap, painfully audible in the stillness of the night, as of a branch breaking on the other side of the stream, I felt sure was caused by the bear, which might, at any moment, approach my resting place. In this I was, however, presently proved mistaken, as Wilson, and not Bruin, peered in under the fly, saying, cheerfully, "Boss, are you asleep?"

He had met the Indians and taken from them most of the provisions, sending them back for more. A long, weary day he had made of it, and, as he told his story, I conceived a gratitude and friendship for him which I shall never lose. For, in spite of a fatigue so extreme that he felt feet and legs could endure no longer, he had left his snow-shoes on some bushes, crawling on hands and knees the rest of his journey, more than half a mile; and, all because he felt it his duty to return to me that night.

We were now confident of being on a north fork, instead of the main stream. To regain the latter, we must retrace our footsteps, carefully on the lookout for its mouth on the south side. The start the next morning was a late one, our rest after so much fatigue having been undisturbed, long and refreshing. Departing from this abiding place of uncertainties, we christened it Lost Camp, while the north fork became known as Sunday Creek. Keeping as close to the creek as possible, we observed no change either in forest or stream, for nearly three hours, when appeared a comparatively wide basin, such as might be looked for at the junction of two water-courses. Wilson, pressing forward, through the heavy undergrowth, said there were indications of a large tributary on the other side, a little below, and that we had better cross and explore. This we did, partly on drift-wood and partly wading, and were soon repaid for our efforts, by the sight of a stream, considerable enough

VIEW ON GREEN RIVER.

in size to assure us that it was the main river. Following it, as we had already planned, in less than half an hour we suddenly came upon the nearly obliterated imprints of snow-shoes. All these led eastward, or up stream, and could only have been made by the men who were to build Cabin 5. They had evidently done what they could and returned to Thorp.

Tracing back the snow-shoe tracks, a few hundred feet across the stream, we found the cabin, a rude affair, evidently built in haste. There being nothing in or about it to detain us more than a moment, we pushed forward, intent on going as far as possible before nightfall, following the trail of our friends leading across Tacoma Pass to Thorp. Success raised our spirits, giving us new strength for the rapid journey of the day. About 3.00 P.M., Cabin 4 appeared, so buried in the snow that a descent of some feet was necessary to reach it. We entered, through the door, left purposely unfastened by the party preceding us, and were rejoiced at the sight of a rough fire-place, provisions, and utensils for cooking them. As we had eaten nothing since morning, this opportunity was by no means neglected. Leaving here such articles and supplies as could be safely dispensed with, we started again, intending to reach Cabin 3 before night. The hills soon closed in upon us, steep and slippery. The stream, which now plunged in cascades down a gorge, was bridged in many places, by foot-logs, placed from ten to forty feet above the torrent, whose crossing was perilous, while the ascent beyond became slow and toilsome. When we finally arrived at the summit, fast-falling snow and approaching darkness made it difficult to read the two aneroid barometers I had carried throughout these journeys. Over the descent, on the east, night fell suddenly, shutting out all signs of the trail, and leaving only as a guide, the features of the ground, which kept us in the depression between the hills. Travelling thus for about an hour, we came abruptly upon a big mound of snow, which, on close inspection, proved to be Cabin 3. This was only a bare shelter, where we made a light supper on some food we still had with us, and passed a comfortable night, early dawn seeing us on our way. The course was now nearly all down hill. The woods were comparatively open, the trail was well marked, and the snow, which covered many obstructions, in good condition for snow-shoeing. Thus it was that we made a rapid march, reaching Thorp before dark, and meeting the men we sought. They had arrived but three days before, and were preparing to return to Cabin 5 with more supplies.

Having sent Wilson and a companion to Tacoma, with a report of our trip, I left Thorp on the 14th and went to Cabin 3, where supplies for the proposed expedition northward, along the range, had preceded me. One man had been left behind, in care of the place, and with instructions to observe and note the readings of an aneroid, at morning, noon and evening, of each day of our absence. The remaining three men, James Gregg, Andy Drury and Mathew Champion, accompanied me. The next day, we explored about Tacoma Pass and Sheets Pass. On the 16th, everything being in readiness, we started northward, following a tributary of Cabin Creek to its source, on a spur, elevation 4,400 ft., where we camped for the night in deep snow, among balsam trees, and within a short distance of the main divide. In the morning we climbed to the top, where there was but little timber, and where the range was sharp and well defined, with a course nearly due north. Progress was rapid until afternoon, when the general direction curved to the northeast, and a mountain confronted us, up whose sides the forest extended to its very peak. At its summit the barometer marked nearly 5,500 ft. elevation. Here the timber ceased abruptly, affording a grand panorama of the surrounding mountains, except towards the north, where projecting spurs and the forest cut off the view.

Our course was now nearly due east, until we reached a much lower elevation, where we called a halt for the night. At the beginning of the descent, one of Andy Drury's snow-shoes caught in the other, throwing him headlong down a steep slope, and plunging him into the snow, nearly out of sight. From this incident came the name of the mountain, Snow-Shoe Butte. The railway now skirts a portion of its base. For several days we had been blessed with fairly good weather, but the next was one of the most dismal I remember having seen. It blew a gale and was severely cold. With the wind came a thick fog, which, added to the gloom of the balsam forest, made our movements groping and uncertain. The moisture seemed to congeal in small, sharp crystals, which found lodgment in every wrinkle or fold of our clothing, and also made it difficult to face the wind. Making for the highest ground, we did our best to follow the divide, whose crest was no longer clearly defined. This, however, soon changed its course from an easterly to a southeasterly one, and, also, fell off rapidly in elevation. As we felt our way along, the constantly descending course of the ridge led us to conclude that, since morning, we had, somehow, missed the main range, and must be following a spur which would lead to Yakima River. So little was visible that some brief explorations only added to the uncertainty; and we spent the whole day crawling about the northerly slopes of the mountain, in the endeavor to find a ridge so decidedly bearing north as to give assurance that it was the main divide. At night we brought up near the previous night's camping place, annoyed at the loss of time, but now quite certain that our morning journey was in the right direction, and that, if we had pursued the ridge farther, we should have come to a bend to the north, an indication that it was none other than the main range.

Those who have ever had occasion to trace an unknown divide, where the view is cut off by dense forests, understand how easy it is to get astray on some spur, or lateral ridge, and follow it, perhaps for hours, before the mistake is discovered.

Starting early on the 19th, with our route for the morning, at least, quite settled upon, and, with favouring skies that lightened our hearts, we made excellent progress. A little after nine o'clock, appeared a sharp bend in the ridge to the north, as anticipated, whence we descended, along a well-defined crest, so rapidly that in less than an hour the barometer marked only 3,495 feet elevation, at a point where, for a little distance about us, there were no trees. It was evidently one of the lowest parts of the divide. To the east, a spur cut off much of our view, but facing west we looked down Sunday Creek. Beyond its confluence with Green River, were the mountains to the south, covered with dark fir forests, and, back of them, the great snowy mass of Mt. Rainier (Tacoma),* sharply defined against the blue sky. It was a beautiful scene, and so impressive that for a moment all were silent.

Thence we continued our trip northward, finding several other depressions in the range, but none as promising as the one just described. We finally descended from the divide to Lake Kitchelos, the source of the Yakima, arriving at Thorp the afternoon of the 23d.

The exploration now finished, although toilsome and often discouraging, had made the Green River region accessible. Surveys which then succeeded were followed by the building of the Cascade

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* The peak was named in May, 1792, by Capt. George Vancouver, R.N. In his *Voyage of Discovery to the North Pacific Ocean, etc., etc.* (3 vols. 4to and Atlas, London, 1798), is the following passage (vol. 1, p. 235):

". . . the round, snowy mountain, now forming its southern extremity, and which, after my friend Rear Admiral Rainier, I distinguished by the name of Mount Rainier, bore N. 42 E."

The original Indian name of the mountain, Tacoma, is said to mean *the nourishing breast.*

Division of the Northern Pacific, under my own direction, through the pass we had found, thus closing the gap in the main line that connected Lake Superior's waters with those of Puget Sound.

MT. RAINIER, SEEN FROM TACOMA.

The Pass was, for a time, known as Garfield Pass, in honor of a President, during whose last days it was discovered, but, later, it was named Stampede Pass, from the following incident. Some weeks after its discovery, while encamped on Sunday Creek, I became dissatisfied with the progress of the party cutting trails which would be required before instrumental surveys could be extended across the divide, and sent them a foreman well known as a hard worker. His arrival became the signal for the flight of several men from the locality which was but a few hundred feet west of the summit, and which thus obtained a name; both their camp and the small lake near it, and, later, the Pass itself being called Stampede. The elevation of the Pass, as corrected by the aneroid at Thorp, whose elevation was known from instrumental survey, proved to be 3,725 feet. As determined by spirit level, it is 3,693 feet. The summit tunnel, 9,850 feet in length, reduces this figure to 2,850 feet.

The traveller of to-day, who crosses the Cascade Range with the ease and rapidity made possible by the railway, cannot realize that nearly three months were consumed by the expedition I have described, while at no time was the party more than one hundred miles from Tacoma.

When one visits the thriving cities and towns reached by this railway, where, before its construction, stood mere settlements or unbroken forest, one begins to appreciate what a significant factor it has become, in the development of a most interesting and important section of the country; and the engineer feels how great a thing it is, to be one of the many forces that go to the consummation of such an enterprise.

THE COAST DESERT OF PERU.

(A Lecture delivered before the American Geographical Society by Maj. ALFRED F. SEARS, M. Am. Soc. C. E.)

No country on the face of the earth has been the subject of more fine writing by the itinerant magazine men of the United States or the victim of more pictures by the snap-dragons of art than the land once conquered and civilized by the wonderful children of the Sun, brutalized by the Arabs of Spain under the bloody banner of the Latin Cross and immortalized by the brilliant pen of the American historian, Prescott. And yet we are able to boast the possession of a denser ignorance touching that republic, nearer to us than San Francisco or Liverpool, than we would like to acknowledge concerning the Sudan or Abyssinia.

We have important interests there, and the people of Peru, more than any other nation, our laws are copying and all our methods learning. Vast amounts of American capital and American genius have been exercised in Peru. When our countryman, Henry Meiggs, died, he left contracts of $124,000,000 in the hands of his executors, which have since passed into the coffers of Englishmen. American capital is in the mines of Peru, working; in shipping also, in railroad building and the richest crops of the tropics farming. The most extensive sugar machinery in the world is at Lurifico, in the coast desert of Northern Peru, and is the property of an American, formerly a civil engineer of one of Mr. Meiggs' railroads. The immense ice-making and brewing establishment of Backus & Johnson in the capital city of Lima furnishes ice and beer to the whole south Pacific coast, and is another case in point where two young men who went out there, assistant engineers on the Meiggs contracts, turned their attention to other enterprises, when the railroad systems were paralyzed by want of money. In 1890 they sold their plant for £500,000 to an English syndicate and are retained in its management. The same men have developed the Casapalca silver lode, where they are doing some profitable mining. Another American engineer has devised a system of irrigation for the vast fertile plains of the valley of the river Piura in Northern Peru, and has organized a company in New York of some of the wealthiest merchants engaged in South American trade.

But my countrymen have written more fiction of Peru than that unfortunate country deserves. One well-known writer told us five years ago of a revolution which he saw in the streets of Lima, when the truth is, that until this year, Peru has seen no revolution since 1849. A newspaper said, "A cargador assaulted a fellow on the street and was arrested by a policeman, when his companions attempted his rescue. But the timely arrival of a squad of police suffocated the revolution in a half hour." The press of South America is learning the mistake of using this word "revolucion" for every little street row or regimental revolt, which they are coming to comprehend does something worse than sell newspapers, inasmuch as it injures the credit of their governments. It was, however, the natural rodomontade of the Arabian. A late writer, among other falsehoods, declares that the streets of Lima are as narrow and crooked as those of Boston, whereas the map of that city, laid out more than a century before William Penn made the plan of Philadelphia, shows that it might easily have been the model of the more modern American capital in every feature of a city street. No checker-board lies in squarer squares or straighter lines. One George Fitz-Roy Cole, of London, in a book, which he entitles "Peruvians at Home," when writing of the Plaza of Lima, breaks forth into such stupendous falsehood as this: "Of how many important events in Peruvian history, of how many sanguinary scenes has this plaza been the scene. * * * How many unpopular presidents have been sacrificed to the vengeance of the public and hung from the top of the round towers that stand on each side of the cathedral door, it would take long to enumerate." The Society may discover in the view presented of the cathedral, and every periodical of this country has published similar views, that the towers of the cathedral are emphatically square, and that the door consists of three grand portals. We recognize thus the amount of acquaintance our author has had with the City of Lima. The truth is too evident, that these professional tourists deceive their employers. If they see a country at all they rush across it with one eye shut and the other filled with the dust of prejudice. But with all this allowance, it is difficult to understand how Peru has acquired the reputation of assassinating presidents. A minister of the cabinet of Balta assassinated that president in the palace of government and proclaimed himself dictator. He was immediately seized by the citizens whom he had outraged and lynched to death and the legally elected candidate, Manuel Pardo, was put into the position to which the people had chosen him. Gutierrez was thus executed by the people whose patriotic con-science he had offended, and his body was hung from a scaffold which had been used in the repair of one of the cathedral towers and not yet removed. This is the story and the sequel of the only assassination of a president in all the history of Peru; meantime this United States has treated the world to the spectacle of two such horrors.

The people of Peru are not a warlike people; they are not in any way revolutionary. As they were the most civilized of all the aborigines of the American Continent, so to-day they are the most refined, most gentle and most lovable of all the Latin-American states. The young men of Peru of the well-to-do classes are better educated than the same class in any other country with which I am acquainted, excepting Prussia. It is no unusual thing to find them conversing in the drawing-room with men of English, French, Portuguese and German birth as if those tongues were their own.

A large foreign population of Peru testifies to the safety of the country for foreign interests. When the nation was in the midst of great suffering from Chilian invasion, the property of foreigners was sacredly guarded from spoliation on the part of the hungry masses. Every foreigner will testify to the perfect protection he enjoys under all circumstances in his property, his family rights and his life. In short, for beauty of climate, delight of social life and all association, Peru is one of the most charming of countries.

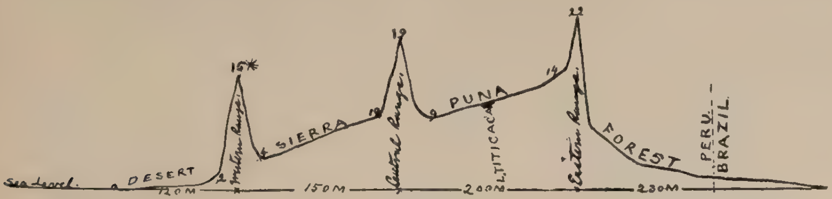
There is a popular superstition among Americans that Peru is a long way off and difficult of access, and this belief is made a reason to the American for not investing in the country. A glance at the map illustrates the mistake. There is no difficulty in discerning that Lima is about the same distance from New York as San Francisco. But the truth is, that if one considers the itinerary of any railroad line to the Pacific coast, it is seen that Paita, the northern port of Peru, is considerably nearer to us than the California metropolis. The voyage, too, is a charming one. When you have left Sandy Hook in a ship of the Pacific Mail or the Columbian Company your course due south, in twelve hundred miles, takes you so near to the east end of the island of Cuba, you see the light-keeper's family standing out on the sands watching the great ship go by. Then steering S. by W. you run across the Caribbean Sea, 800 miles into the bay of Colon, where, on the Isthmus of Panama, a short railroad ride of about fifty miles relieves the tedium of the sea voyage, to be resumed at Panama in the splendid ships of the Pacific Steam Navigation Company. The distance to Paita is 900 miles and to Callao, the port of the capital city of Lima, 500 farther.

Thus you have a trip of only 2,800 miles to Paita and 3,300 to Callao.

Arrived at Callao, one meets a system of docks such as are not possessed by any port in this country, unless we except the City of Boston.

The Zona-seca,—dry zone—of Peru, extends the whole length of its coast, from the northern limit of 3 S. lat. to 22 S., now in the possession of Chile since the peace of Ancon, which ended the late war between the two republics. This zone measures 2,000 miles in extent along the coast, while covering only 1,200 miles of latitude, and is 120 miles wide in the extreme north, narrowing to barely twenty at the southern limit. The coast is well supplied with harbors, in bays sheltered from the south-western sea swell, but there are also many ports where the ships of the coasting trade must remain in open roadsteads, exposed to the uncomfortable rolling of such places.

The bays of Paita, Sechura, Chimbote, Callao, Samanco and Norato are secure, land-locked havens, every one of which can be easily defended by shore batteries and is of capacity for the largest ships that float. The attention of the American government has often been called by our naval officers to the expediency of asking a coaling port of Peru in the magnificent Bay of Chimbote, a harbor eight miles long and four wide, with first-rate anchorage and depth for our largest war vessels. Chimbote is at the mouth of the Santa Valley, famous for its coal deposits.



THE FIGURES ALONG THE PROFILE LINE DENOTE THE NUMBER OF THOUSANDS OF FEET ABOVE SEA LEVEL.

The accompanying sketch is a profile across the northern part of the republic, and shows the division of its territory by the different ranges of the Andes. The Coast Desert rises gradually from the level of the Pacific to nearly a thousand feet when the profile enters the foot-hills and we ascend the western range of the Andes, peaks of which attain a height of 15,000 feet above the sea; crossing this cordillera, we go down to the plain of the sierra, which stretches away to the east, rising in a distance of 150 miles to

10,000 feet, and then come to the middle cordillera, in which are peaks 19,000 feet above the ocean. After passing this ridge, we fall again to the Puna (a word signifying hard breathing), which at this western edge is 9,000 feet above sea-level, and, like the sierra, rises in a broken plain to a height of 14,000 feet at the foot of the grand eastern cordillera of the Andes, where the noblest mountains of the continent are found, summits of which are 23,000 feet above the level of the ocean.

The Coast Desert as seen on this profile is embraced in the Department of Piura, the northernmost section of the republic and in every respect the richest of the country. Every reader knows something of the nitrate coast of Peru and of the conservative effects of saltpetre. I met a droll illustration of this influence combined with that of the atmosphere, at the port of Paita on the edge of the great coast desert. One morning walking in the cemetery, I saw a coffin lying outside the dead-house and uncovered. In it was the body of a man, whose purple shirt and cotton drawers bespoke the corpse of a priest. I visited the curate of the parish to speak of what I thought a disgraceful circumstance, with some reproach for his disregard of the condition of the cemetery. "Ah!" said the curate, "my dear sir, you don't understand; that is a friend of mine, that I have put out there to dry so that I may send him to his family in Guayaquil." Thus you may comprehend the mummies of Peru.

With the aid of this profile it is easy to understand the phenomena which produce the aridity of the region that we call the Coast Desert as well as some other interesting meteorological conditions.

The vaporizations of the Atlantic and the great water area of the Amazon basin are blown by the trade winds across the continent, leaving in the region east of the Andes their heavier condensations and all the territory over which they pass, enriching. And the eastern cordillera reaching, they are thrown by the obstructing ridge into the extraordinary altitude of 20,000 to 23,000 feet above the level of the ocean, encountering a degree of cold that squeezes still more moisture from the magazine of cloud; yet, not quite all, for upon the Puna falling, they drop treasures there of cold rain, mist, snow and sleet, and then reaching the middle range are almost entirely exhausted, but at certain seasons are able to wet somewhat the plains of the sierra.

There is, therefore, no water for the western range, which is accordingly in the arid belt like the pampas of the coast.

And yet sometimes there are rains in the western cordillera, the origin of which it is interesting to consider.

The trade winds having reached that ridge and being already robbed of their cargoes of vapor, stand out towards the Pacific Ocean and thence on across the globe in their proper zone. But now an obstacle occurs to interrupt their march. The torrid sun, shining on the desert along the coast, rarefies the atmosphere and to fill the partial vacuum thus created, a part of the air, which had passed out to sea comes rushing back, and so we have a sea breeze after eleven o'clock in the morning when the desert has grown warm under the blazing beams. This wind from the sea is delicious; it was sifted through the snow-clad Andes, it has passed through the sunshine of the pampas, has been again tempered by the soft vaporizations of the ocean, cooled by the Antarctic or Humboldt current, and is now turned again to the grateful land through the beneficent laboratory of Nature, a truly heavenly gale.

Ordinarily, this returning wind fails to bring from the ocean vapor enough to afford rain. But in the midsummer months of December, January, February and March, when the vaporizations are most rapid and voluminous, there is sufficient for a considerable condensation in the western cordillera, which amounts to rain and sometimes to a very heavy rain. Once in a cycle of years—as we shall presently see—the rain extends from the mountains nearly to the Pacific shores.

The re-entrant wind-current is felt at sea a distance of fifty to a hundred miles, so that navigators passing the coast must keep outside that distance to get the influence of the trades.

After the earth of the desert grows cool in the evening, the wind sets in the opposite direction, and you feel in the pampas a breeze directly from the mountains, so cool, a blanket is good on the bed and a thick poncho if you are riding in the open air.

This meteorological condition makes it practicable to raise coffee in the coast valleys of Peru; the cool, moist atmosphere being the equivalent of the 2,000 to 4,000 feet above sea level essential for the plant in all other regions where it is raised.

The traveller, who follows the course of Pizarro in the steamers of the Pacific, wonders when he enters the bay of Paita, whence came the fruit and flowers brought as presents by the aborigines, "to the vessels of the discoverer." Before him and all around the bay, rise the naked walls of the barranca, three hundred feet above the beach, from base to summit and bald as any rock, a brown, gray sand utterly unpromising. Going to the plain above, he beholds only a treeless desert stretching away to the foot-hills of the still more distant cordillera; no living green thing, no blade of grass, no little shrub gives rest to the eye, wearied with the dreary wastes of sand. For land-marks some ledge of gypsum crosses the trail that leads into the mesa towards the towns of the Piura valley and the Chira; an insignificant eminence scarcely a hill, too hard baked in the sun to be blown away, forces the traveller to make a detour and so gets unmerited notice because of its novelty in the widespread monotony. Sometimes the skeleton of a mule or horse becomes a monument to mark the otherwise blind trail. Occasionally the traveller enters a belt of *médanos*, crescent shaped sand-dunes, looking like small detached fortifications of which the material is always afloat in the wind, travelling to leeward in eternal migration. In the early morning air, you hear in this desert a peculiar minor music; if there were trees at hand, you might think it the sighing of the wind in the branches; then you note flying glassy particles, that roll up the slopes of the *médanos* and think, in this attrition you have found the source of the mournful cadence, that seems to fill the whole surrounding atmosphere. Profanity of science! Be still and listen! it is one of the sad *haravis* of the sierra; the spirits of departed Incas are chanting solemn dirges over the lost children of the sun!

But once in five to seven years there comes a marvellous change over all this scene. A shower, sometimes two or three, wanders away from the mountains and is poured over the arid land; then what wealth of beauty leaps under the wand of nature! the hitherto lifeless earth springs into being; grass and flowering plants appear on every hand, grown to the height of a horse's head. The bright yellow leaf of the Amancaes (ismene amancaes); the red petals of the papita of San Juan (begonia grandiflora) contrasting with the white inner sides; valerians, the beautiful bomarea ovata, innumerable species of oxalis, solanum and crucifers; amaranths that live on the nourishment drawn by their long penetrating roots, have been waiting all this time to give the world the beauty of their bloom; martynia and aniseia; algarroba (prosopis horrida) a stunted honey locust; vicaya (capparis crotonoides); the sapote* del perro or dog sapote so called because the hungry dogs of the town roam in the pampas in search of this savory fruit (colicodendron scabridum) and gigantic cacti.

Whence comes all this brilliant life? How has it slept in the ground during these years? It lasts a week and has been known to live nearly a month; cattle and great herds of goats wander out of the inundated valleys across the living field and revel in the boundless joy. When they return we know the beauty is departing and death is settling on the scene; in this short space of time the souls of these beings have ripened for the resurrection to which they will spring in another cycle of seven years.

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* According to Pichardo (*Diccionario de Voces Cubanas*) *sapote* is correct, but the Spanish dictionaries give *zapote.*—(Ed. BULLETIN.)

As illustrating the value of the wonderful vegetation of the Coast desert after the septennial rains, and also the ability of the Peruvian to turn his circumstances to account, I may tell you the story of the Tambo of Congará. It was thirty years ago, before there was a railroad in the department of Piura. An enterprising cholo built a tambo—an inn—in the middle of the desert, half way between the capital of the Department and the port. The fellow had to transport every stick and tool from a distance of seven leagues. His work was regarded as a blessing by everybody having to journey that road, and they were many. He supplied them with meals at reasonable prices and every quart of water as well as every pound of food was brought from the port, seven leagues away.

When he got well established, the owner of an hacienda, Macacará, on the Rio Chira, made his appearance and demanded rent for the little bit of desert land that was supposed to be without other owner than the government. After investigation the rent was paid because the claimant had a grant from the Spanish crown, by which it was shown that the hacienda, Macacará, extended towards the foot-hills of the Andes as far as the goats would go before they returned to the river for water. And it was known that in the fruitful septennial year the goats of Macacará went far beyond Congará, before they returned to the Rio Chira.

In this connection it will be interesting to note the fact, that seems to have escaped the attention of the historian, which is, that Pizarro began his conquest of Peru in a wet year, of which the evidence is complete. It rains on the northern coast of Peru only once in seven years. All the remaining years are utterly dry. Pizarro could not have gone from the Tumbez, where he first landed after his fight with the Indians at Puna, to the valley of Tangarará and found feed for his animals, nor would he have found the little settlements mentioned as existing along the road in any other season than a wet one.

Again, he would not have been driven from the Chira Valley, Tangarará, by malarial fevers, save in a wet year, as it exists in that valley only in wet years; and, third, he is said by Prescott to have "crossed the waters of the Piura River in September," when he started out on his conquering tour against Atahualpa. But only in a year of rain, which falls in February and March, is there any water in the Piura River after the month of June. In wet years it remains till the month of November, and has even been known to remain the whole year round, when in February of every year a lesser flood comes down. Had Pizarro attempted the conquest of Peru the previous year, when for the first time he reached the bay of Paita, he would have been defeated by the aridity of the desert. Only that one year, in the middle of fourteen, was adapted to his success. Was it Providence or luck? The pious Catholic has no difficulty in deciding.

The waters of the Pacific Ocean along this coast teem with excellent fish, of which the corbina, not known in the northern temperate zone, weighs from six to twelve pounds and is of rare delicacy; skate, sole, plaice, cod, haddock, flounders, smelts and Spanish mackerel abound in the sea, while in the streams are found shrimps and prawns, these latter of enormous size, weighing not unfrequently a pound and of exquisite flavor. Lobsters are found along the shores of the bays.

The desert of the coast affords life to the iguana, an enormous lizard and numerous smaller ones; also to rabbits, foxes and jack-rabbits; here also are vultures and condors; owls and bats; in the lower valleys the vampire bat and game birds abound, the partridge, pigeons, parrots, cuaresmeros (a kind of ruff). The singing birds are numerous and of beautiful plumage. In the valley of the Chira a superb oriole is the chiroca, named from his habitation in that valley; a fine nightingale called the ruiseñor, paroquets and a variety of small birds that fill the air with song and beauty. Domestic fowl abound and the world owes to Peru that prince of the dinner feast, the turkey. All the domestic animals, that are used in civilized parts of the world, have found their way to the Pacific coast. There still exist in the mountain districts the llamas, left to us from the times of the Incas and the only beast of burden indigenous to the country or known to its people before the Conquest.

The discovery of new and natural sources of wealth in Peru is an unending wonder. From that day in 1531 when Pizarro entered the bay of Paita, welcomed with gifts of flowers and fruit, whose brilliancy and lusciousness had been as yet unknown outside the Inca world, and the visit ashore, where the gentle-mannered subjects of the "religion of Divine Light" offered him the sparkling chicha in golden goblets, that delightful land has presented the world an illuminated procession of revelation extending along nearly four centuries of its modern history. The Spaniard had passed but a single day and night in the beautiful bay when he gave to his poetry the lovely image of "el Sol de Colan y la Luna de Paita" (the sun of Colan and the moon of Paita), in itself a story of heavenly beauty and delicious climate.

But when to ransom Atahualpa, their adored Inca, the Peruvians filled a great apartment of Cajamarca, with gold as high as a man could reach, and the conquerors followed this first shipment with invoices of precious stones and metals, with the potato, the turkey and maize; with alpaca wool and vicuña, Peru became a prey to all the greed of Spain, and even since acknowledging the independence of the republic she has attempted to recapture the country.

One of the northern valleys, the Piura, now claims attention, because of the production of an extraordinary class of cotton. This article had not been thought of value for exportation until within the last three years, during which time it has become of demand in England, far exceeding the supply, and is now attracting the attention of manufacturers of fine underwear and hosiery. It grows in various colors, of which there are now produced twelve shades, ranging from a beautifully pure white, through a delicate buff, two or three shades of pink, a light brown, up to a rich, dark, red brown.

It is in use by the English manufacturers to adulterate fine woollens. Hitherto its use has been confined to Peru for the manufacture of coarse ponchos and the striped saddle-bags of the country.

The lands of the Piura lie four to five degrees south of the equator and once in seven years are visited by floods that wet a narrow belt along the banks, whereby some 1600 acres are made available for cultivation, all of which is now appropriated to cotton. This one wetting gives five crops, two per year, and then the land rests to finish the cycle of seven years and then another procession of five crops.

As already said, the waters of the Piura River continue in sight in the floods of rainy years till October, and often later. In other years they disappear in the sands in June and the people who live in the valley begin then to sink wells in the river bottom for their daily supply. This disappearance of the river is so gradual it is not possible to designate the day when it takes place; not so its arrival in February or March, when the bed of the stream has been dry for months and occupied for truck gardens. Then the people have become thirsty for the river. Every traveller from up the valley is questioned as to where the river was when he passed. If he report that it is coming a crowd of eager listeners and questioners surround him as if he had brought the important news of a foreign loan commission, and naturally enough, for the condition of the river, whether it contain much or little water, is the prophecy of the year's crops. At last, generally about the end of February, one hears that the river is twenty leagues away and coming; a few days later it is only ten leagues distant, and as it passes the upper haciendas, the Indians turn out and welcome it with drum and fife and fire rockets.

Sometimes there comes a disappointment; for when it seems a sure thing and the people of the City of Piura in the lower valley have begun to look for it, the river will have ceased to flow; it sinks away in the sands and they say "the river has gone back." This, however, will last but a few days. Again it comes and we hear in Piura that "the river is but a league away and will be here to-day." Then every horse and saddle is brought out and the people leave the city to meet the messenger of glad tidings, of health and riches to the arid land.

In all the year there is not in the north of Peru a feast to equal this. No fatigue is felt by the multitude, who travel through the heavy sand; some on foot, some on donkeys that carry two or three men and women with a small family of half-grown children; others again are mounted on mules and then the élite on horses.

All are glad!

When you meet the river it is a little trickling streamlet running here and there in search of the lowest places; it stops to fill the wells in its way that were excavated last season and then runs forward, the same little rill. A short distance farther up the valley, from which it has come, you will find it a respectable stream, where the boys and dogs run into it and lie down and revel, and in a little time can swim. It is for everybody a season of real joy, and with many a carnival of frolic.

The spectacle of its approach witnessed from the bridge of Piura is a wonderful sight. First, you discover the pioneers of the marching host come slowly around the bend of the river at the upper edge of the town, followed shortly by the surging army of thousands of people; you hear the music of the band, the murmur of five thousand distant human voices and the din of rockets, which throw a smoking line along the air.

The river has come!

I saw it reach the bridge in the early evening and the band played while the people danced on and under the bridge all night long, or as long as the increasing flood permitted. If five thousand turned out to escort the river to Piura, it was met by fifteen thousand or more at Catacaos, an Indian city six miles lower down the valley. And so the River Piura has a triumphal march from the mountains to the ocean at Sechura, where, sadly enough, all this wealth and glory are cast into the sea and pass away forever.

Two thousand million cubic metres per year are thus lost of a treasure worth more to a people than any guano or nitrate deposits, because it represents the source of life to the common people, who have only to stretch forth their hands in honest industry and secure its bounties.

A concession has been given to an American engineer, who devised a system of irrigation for this valley several years ago, for the purpose of developing the wealth, which has been slumbering ever since the Incas were dethroned.

At the present time the cultivated area is so small that the demands of the market for the cotton of the Piura valley cannot be supplied. By the system proposed it is hoped to get more than a million acres of this fertile territory under improvement, when, not only cotton but sugar, coffee, cocoa, indigo and all the fruits and vegetables of the tropics can be grown as they were centuries ago, and American capital will thus make an opening for American influence among a people most friendly to our country and in a land accessible to our commerce.

Some years ago Mr. Samuel McElroy, an American civil engineer, made surveys of the Chimbote Pampas, a few miles south of Piura, for the purpose of devising a system of irrigation. His opinion was that the land was peculiarly adapted to cotton. The system has been constructed as he advised, by restoring an old canal of the aboriginal Incas. The singular fact is that while the universal judgment indicated the land for cotton, it has all been put into sugar and not a cotton plant is raised in the district. The sugar crop yields 9,000 pounds of sugar per acre per year. After the cane is once ready to cut you may pursue the cutting and sugar making every day in the year.

At the plantation known as La Puente, the most important of the region, having an appraised value of five million dollars, produced by a single irrigation canal of moderate cost from an arid desert of most unpromising complexion, there had been erected one of the two most extensive sugar manufactories in the world, being the twin of the Lurifico mill, to which I have already referred.

This magnificent establishment was brutally destroyed during the Chilian war by Admiral Lynch, in command of the Chilian Navy. The Lurifico affair was prudently spared as being the property of an American citizen.

The appearance of a Peruvian cotton field may well astonish an American planter, for in the five years of its growth the plant often reaches the height of twenty feet, and in the weeks of ripening has all the beauty of an immense sunlit snowdrift.

The Peruvian "tree-cotton," of which a good deal has been written, is really only an accident. The trees are from seeds deposited in some wet place during an exceptionally high flood and left without attention during succeeding years. But where the supply of water permits, the crop is replanted every seven years, the second, third and fourth crops being the finest and most abundant of each planting. There are low spots where veritable cotton orchards are found of which the trees are forty years old. But they receive no attention, save when an extraordinary flood happens to give them a spasmodic vigour of life for a year or two.

As the American sea-island cotton is chiefly used for admixture with silk, so the cotton of Peru, and especially that of the Piura valley, is almost entirely devoted to the adulteration of fine woollen goods, to which it adds strength, lustre and protection against shrinking. Its value fluctuates accordingly, in the market with wool and not with cotton, of which it is quite independent. It is at all times vastly more costly than any other cotton except the American sea-island. It permits the manufacture of a stylish underwear in many various colors and of real sanitary quality since it contains no poisonous dyes, but ripening in the sunshine is also proof against fading.

The story that there exists in Piura a fertile country in which the ordinary labor of cultivation is avoided by the absence of weeds sounds like a fable. It is nevertheless true, as you may readily understand; when the water of the septennial floods recedes from the river bank the weeds grow in grand luxuriance. Meantime the planter has by a shovel sunk holes a depth of two feet wherever he wishes to plant seed. He plants nothing near the surface of the ground, but drops his seed into these holes and by the time the plant reaches the surface, the weeds which had covered the earth have been burned up by the heat of the sun.

The plant, however, has its root well down in the damp earth below the influence of the sun's rays, and as it grows and spreads the more effectually the hole and the root in it are shaded.

The use of oxen is not known in the Department of Piura, nor is any system of ploughing. I should think, however, that all this must come with irrigation.

Some wealthy planters in the valley have introduced English pumping engines, by which they are raising cotton at an expense for irrigating of twelve dollars per acre per annum, with the full understanding that when the proposed system comes among them it can be done for three dollars.

The Concession lately given by the government of Peru offers the first complete opportunity for the employment of American capital and influence in a great public work that has ever yet been presented by this republic. It is especially valuable because it is offered in a cordial spirit and relates to a Department known throughout the South Pacific Coast country as the sanitarium of the continent. The Department contains a population of 150,000 souls, of which 60,000 are in the Piura valley in the section to be irrigated under this concession. This population is largely indigenous and is a gentle race, more virtuous than either the mixed or whites. A late annual report of the Prefect of Piura to the national government, while deprecating that marriages in the Department are not in relation to the increase of population, declares that the Indians marry more than the mestizoes and these more than the whites. As to negroes, which, throughout Spanish America are unhappily the most vicious of the people, they embrace only about one in a thousand of the population of the Department of Piura. Declaring that the illegitimate births are alarmingly in excess of the legitimate, the prefect thinks the exorbitance of parochial charges for solemnizing marriage is a prominent cause of vice among the people.

The Department of Piura possesses in the mineral kingdom, gold, silver, lead, copper, iron, sulphur, coal and petroleum. It also has a great abundance of mineral waters, asphaltum, carbonate and sulphate of lime, salt, alum, nitrates and potter's clay. In the vegetable kingdom it produces cotton, sugar, cascarilla, tobacco, cacao, sarsaparilla, tamarinds, gums, coffee, corn, rice, cherries, all classes of tropical fruits, with vegetables.

There are at present in active operation in the Department of Piura 561 petroleum claims, which are supplying a considerable part of the Pacific Coast market, and are making arrangements for possessing themselves of the Chinese and Japanese markets to which they are nearer than the American manufacturer. At the present time they are turning out 250,000 gallons of refined kerosene per day. Partially refined petroleum is being used in steam boilers and for locomotive fuel on the railroads of the coast. A tank steamer now makes regular trips between San Francisco and Talara, transporting crude petroleum for fuel in California. This grand success has been accomplished for the country by means of a protective tariff, which permitted the manufacturer to perfect the system of refinement.

And concerning this protection by means of a prohibitive tariff, being 40 cents on an appraised value of 30 cents per gallon, it is well for the American to observe that is asked by and granted to English saints, who find that under certain circumstances the doctrine of free trade is not altogether orthodox.

There are also at work in the same Department seven gold mines, two deposits of asphaltum, ten of asphaltum and petroleum in mixture, seven sulphur mines, and three coal mines.

In Catacaos, an Indian city six miles below Piura in the same valley, is a famous manufacturing industry of coarse cotton fabrics (hand woven)—for ponchos and saddle-bags and also of Panama "straw" hats, which are not in any sense "straw" as we understand it, but are made of a soft, green marsh reed. The cotton fabric of the saddle-bags has already been described and its culture; the hats are by all odds the most important branch of manufacture in the republic, if we except the sugar industry, amounting in value to $800,000 a year. Like the weaving, they are the resources of the people when they are waiting for the coming of the river. The merchants of the South Pacific Coast are able to designate the place where a hat is made by the characteristic of plaiting, just as one may locate the nationality of a man by his chirography. Ordinary hats, such as sell in the United States for five dollars, can be bought in Catacaos for fifty cents. But I have seen fine hats sold for one hundred dollars American gold, which are sold in Europe and Cuba for five hundred dollars. These beautiful things are built by contract and occupy the moonlit nights of three months. You will have no difficulty in understanding why the maker must avoid the insect attraction of the lamp and candle and the drying effect of the sunshine upon the delicate reed of which the hat is made. Such hats are like silk; I have heard of one in the possession of the Prince of Wales that he can fold and carry in his vest pocket without injuring its form or texture.

The most important problem now pressing on the Peruvian mind in consideration of the demands of the Coast Desert is that of irrigation. General laws have lately been passed authorizing the President to enter into contracts with parties willing to undertake such works.

The law makes all the lands, accessible to the waters of irrigation liable as security for water rents; it also makes it obligatory on all such land to pay the rent, whether it avail of the use of the water or not. The rents are a lien upon the crops as well as upon the land. When a rent has not been paid for two terms of six months each the irrigating company gets the land by a system of appraisement extremely just—*i. e.*, the annual average value of its productions is to be reckoned six per cent. of the real value. As the land is a desert, producing nothing, this value is nominal. The manner of appraisement is also just, for the manager of the company is one of the commissioners to settle values, and the other is a nominee of the land-owners, there being only two. If these two fail to agree, the case is to be settled by the manager of the company and the engineer of the government, an educated, disinterested gentleman.

The Peruvian government and the land-owners in the valley of the river Piura, as well as in the full extent of the Coast Desert, have thus shown an earnest wish to put their magnificent territory in position for its best development, while allowing the enterprising men, who are willing to invest their money in the country, a good opportunity for extraordinary profit.

It is proposed for the Piura system to build a low dam in the first instance that shall provide water by economizing the floods that come down the stream every February, and instead of allowing it to flow on in waste to the sea as at present, intercept its course, turning it aside and using in its passage to irrigate the pampas to the extent of 80,000 acres, or sufficient to furnish all the population at present there existing, with the land they now require and are capable of cultivating. This work is estimated to cost something less than $200,000, and will give an income, paying enormous dividends on the outlay, besides furnishing means of pushing the works to their ultimate completion.

Nor can this claim be reckoned extravagant when it is remembered that the return on irrigation works in the United States arid regions is 219 per cent. on the outlay, and that none of these are on land yielding an equivalent of the valuable Peruvian cotton, with two crops a year and selling at a higher price than any other cotton in the world, save always the American sea-island.

INDIAN TERRITORY.

BY

HENRY GANNETT.

Almost in the middle of the United States, in the heart of a region thoroughly well known, densely peopled and well organized, is a large tract of country which is practically unexplored, is without civil organization or government except such as is afforded by the tribes which own it, and in which most of the elements of civilization are extremely primitive. This is Indian Territory.

The Indian Territory was never made in the sense of being planned out as a political organization. It is simply a remain. Its area was assigned by the United States to certain Indian tribes before Texas became a part of the United States, when our boundary with Mexico ran along the Red River and the 100th Meridian, which were the south and west boundaries of Indian Territory and Oklahoma. Arkansas was cut off on the east to form a State, and to this country west thereof were transported from the Cotton States the Cherokees, Creeks, Choctaws, Chickasaws and Seminoles. This transfer began in 1832 and was concluded, so far as these Indians were concerned, in 1846. The present Indian Territory comprises their reservations, together with some petty reservations of small tribes in the northeast corner of the Territory. With the exception of these little reservations it is divided among what are known as the Five Civilized Tribes, the following area belonging to each:

Cherokees..........................	7,700 square miles.
Chickasaws..........................	7,250 square miles.
Choctaws	10,300 square miles.
Creeks..........	4,700 square miles.
Seminoles........................	550 square miles.

Of these reservations the Chickasaw Nation has been subdivided by the U. S. General Land Office, and good maps of the drainage of the country have been prepared; but little, however, is known of its relief. Of the rest of the Territory little is known, either of drainage or relief. The only information which we have has been picked up from the explorations of two or three Army expeditions, made half a century ago, and from the surveys attendant upon the construction of the half dozen railroads which traverse it. As may be easily believed, the sum total of this information is sçanty and by no means reliable.

The different parts of the Territory differ greatly in their topography, climate and vegetation. South of the Canadian River, in the portions of the Territory comprising the reservations of the Choctaw and Chickasaw Nations, the country is somewhat broken, being traversed by the crooked, serpentine ridges constituting the southern portion of the Ozark Hills. These hills enter the Territory from Arkansas, and near the Arkansas boundary are quite high, the summits reaching an altitude of 2,500 feet above sea level. Westward they diminish in height rapidly, and in the central part of the Choctaw Nation, few of them exceed 1,000 feet above the general level of the country. They are mainly quartzite ridges, the intervening valleys being floored with limestone, the difference in lithology explaining the topography. It is a survival of the hardest.

North of the Arkansas and Canadian rivers the surface differs greatly from that to the southward. The so-called Boston Mountains extend over into the Territory from Arkansas for a short distance. This is a plateau, deeply scored by streams. West of this broken region the country is broadly undulating.

The eastern portion of the Territory, especially the mountainous and hilly part, is forested. The Chickasaw country and the western portion of the Choctaw country is an alternation of timber and prairie, the timber predominating to the extent of two-thirds or three-fourths of the area. Through the Seminole country and the western portion of the Creek and Cherokee countries extend the Cross Timbers, which from southern Kansas far down into Texas form a well-known timber belt, consisting mainly of black-jack and post-oak. East of it, in Kansas and the Cherokee and Creek Nations, is an open prairie, there being no timber excepting the belts which accompany the streams.

The Territory contains probably a quarter of a million of people, of which over 50,000 contain more or less Indian blood, few of them, however, being full-blooded Indians. Associated with these are 18,000 or 19,000 persons of negro descent. In order to obtain membership in the tribes and thus enjoy the advantages which accompany it, many white men have gone to the Territory and have married Indian women. While these are comparatively few in number, their wealth and power render them a very important element. By far the largest element, numerically, of the population, however, are whites who are not connected by marriage with the tribes, but who are living in the Territory under some form of permit from the tribes. These numbered in 1890, according to the Census, over 100,000, and it would not be a matter of surprise if there were double that number in the Territory at present, as they have been flocking in rapidly in recent years.

The form of the government of the tribes is quite similar to that of States. They elect a Governor and other executive officers, a legislature consisting of two houses, and they have a judiciary, with the other machinery of the law. The government, however, is very feeble, especially in matters affecting the white residents of the Territory, and most of the administration of law is carried on by the United States authorities.

In accordance with the treaties made with the United States, the lands of these tribes are held in common. They cannot be disposed of by the tribes to any party except the United States. Under their laws, any member of the tribe may take up and use any unoccupied land which he desires. This holding, however, is subject to the will of the tribe, which retains ownership of the land. In this way the Indians have located themselves mainly upon little farms, away from the railroads and white settlements. The whites who have become members of the tribe by intermarriage, on the contrary, with their wide-awake Anglo-Saxon enterprise, have seized upon the cream of the country. They hold the town sites, the coal lands and the finest of the agricultural and grazing lands. Most of these lands they have rented to other white men, paying a small portion of the rental to the nation. Thus we have before us a practical illustration of the workings of Henry George's theory of holding land in common, and it can scarcely be said to be a success. The number of land-grabbers being limited, land-grabbing has gone to a far greater extreme than in any other part of the country. For instance, it is said that the entire reservation of the Seminoles is in the hands of one man, the chief, and that the Indians are practically serfs, and the same is the case in less degree in other nations. Another evil follows closely upon this: owing to the extreme uncertainty of all land titles, or rather to the utter absence of them, few settlers dare to make more than the most temporary sort of improvements. Most of the buildings in the towns are of the most flimsy, temporary character. The policy, naturally, is to skim the cream as quickly as possible and throw away the skimmed milk to sour.

With the large number of whites in the Territory not connected with the tribes, but dependent for their leases, and for the improvements they have made, upon the will of the Indians, it will be surprising if the present condition of things lasts much longer. As their numbers increase relative to the Indian population, they will certainly take possession of the civil authority sooner or later, and of their holdings. Such a revolution seems near at hand. It can probably be effected without material trouble, since the Indian population will be greatly outnumbered.

Foreseeing this possible result, the United States has been, for some time past, attempting to negotiate with these Indians with a view of giving up the tribal governments, divide their lands in severalty, and thus make it possible for the whites to obtain deeds to whatever land the Indians do not actually require. A Commission is at present in the Territory attempting to treat with the Indians, but the latter, influenced probably by the whites who are members of the tribe, and who have every reason to be satisfied with the present arrangement, refuse to treat with them in any way. Indeed, under the circumstances it seems to be a very difficult situation. The only easy solution would seem to be to give every one connected with the tribe whatever he claims, which would result naturally enough, in giving the Indians proper very little and the white men who have married into the tribes the lion's share. On that basis, it is altogether probable that there will be no trouble in coming to an understanding and agreement with the Indians, owing to the influence which these white men among them have over them.

As a preliminary to the allotment of lands among the Indians the United States Government has commenced the subdivision of these lands into townships, sections and quarter-sections. An appropriation of $200,000 was made by the last Congress for this purpose, being the amount estimated to be necessary for subdividing half of the Territory, with the exception of the Chickasaw Nation, which has already been subdivided. This work was, under the appropriation act, placed in the hands of the Director of the U. S. Geological Survey, to be executed by the Topographic force connected with this Bureau. The work was commenced in April, 1895, and is being rapidly pushed forward, and by the end of the year 1896, providing Congress continues to support it, the subdivision of the Territory will be completed.

As there are some features distinguishing this work, as executed by the U. S. Geological Survey, which differ from the ordinary work of the subdivision of lands by the General Land Office, a few details regarding it will be of interest.

The base line of this work is a continuation of the Indian base which is run across the Chickasaw Nation. The principal meridian corresponds with the east line of Range 8 of the system of surveys. Standard parallels are run at every twenty-four miles north and south of the base line, and guide meridians are run every twenty-four miles east of the principal meridian Township exteriors, and subdivision lines of the townships are run according to the ordinary practice of the Land Office, as prescribed in its Manual. These features are common in all public land surveys, but the distinctive features are as follows: A base line has been measured near Savanna, in the Choctaw Nation, an expansion effected and triangulation extended therefrom over the country in advance of the work of subdivision. With the stations in this triangulation the township and section corners have been connected by angular measurements from the corners. The result of this is to have the whole system of subdivision lines controlled by a primary triangulation, by means of which errors become known and can be corrected, if of such magnitude as to require correction, and if otherwise allowance can be made for them. Moreover, in case the marks of any corner should be lost or destroyed the corner can be recovered from the nearest station in the primary triangulation, since these points are marked in the most permanent manner.

Another feature is, that as the work of subdivision goes on topographic maps are prepared. These maps are made upon a field scale of two inches to one mile, and show the drainage, roads, settlements and even isolated houses. They show the relief of the surface by means of contour lines at intervals of twenty feet. The extent of marsh land, of wooded and prairie regions are shown in detail, thus furnishing much valuable information regarding the country for the immediate use of all parties interested in the allotment, including the Government on the one hand and the Indians upon the other. Besides this immediate use, of course the maps will be of the utmost service for all future improvements which depend upon the surface of the country.

The work of extending primary triangulation and of preparing these maps forms but a trifling addition to the cost of making the subdivisional surveys.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

THE POPULATION OF THE UNITED STATES.—The Census Office has just issued the *Report on the Population of the United States at the Eleventh Census, 1890, Part I.*

The area of the country (exclusive of Alaska) is 3,025,600 square miles, and the total population (excluding the inhabitants of Alaska, the Indian Territory and the Indian reservations) was, on the 1st of June, 1890, 62,622,250. The following table gives a view of the progress since the year 1790:

YEAR.	POPULATION.	AREA SQUARE MILES.
1790	3,929,214	827,844
1800	5,308,483	827,844
1810	7,239,881	1,999,775
1820	9,633,822	1,999,775
1830	12,866,020	2,059,043
1840	17,069,453	2,059,043
1850	23,191,876	2,980,959
1860	31,443,321	3,025,600
1870	38,558,371	3,025,600
1880	50,155,783	3,025,600
1890	62,622,250	3,025,600

In computing the density of the population, the land surface only has been taken, and Alaska and the Indian Territory have not been considered. With these restrictions the density was: In 1790, 4.89; in 1800, 6.61; in 1810, 3.69; in 1820, 4.91; in 1830, 6.35; in 1840, 8.43; in 1850, 7.93; in 1860, 10.84; in 1870, 13.30; in 1880, 17.29; in 1890, 21.31.

The most densely peopled States, for ninety years, have been Rhode Island and Massachusetts. In 1890 the former had 318.44 inhabitants to the square mile, and the latter 278.48.

The District of Columbia, with a population of 3,839.87 to the square mile, is in fact a municipality.

The white inhabitants of the country numbered, in 1890, 54,983,890. Of these 34,464,247 were of native, and 20,519,643 of foreign, parentage.

The coloured population numbered: *Negroes, 7,470,040; Chinese, 107,475; Japanese, 2,039; civilised Indians, 58,806.

According to the census of 1870, which is declared to be untrustworthy, there were 14,528 negroes to 100,000 whites. In 1880 the proportion was 15,162 to 100,000, and in 1890 13,586 to 100,000. The percentages of the two races at each census were:

YEAR.	WHITE.	NEGRO.
1790	80.73	19.27
1800	81.12	18.88
1810	80.97	19.03
1820	81.61	18.39
1830	81.90	18.10
1840	83.16	16.84
1850	84.31	15.69
1860	85.62	14.13
1870	87.11	12.66
1880	86.54	13.12
1890	87.80	11.93

Of the 20,519,643 persons of foreign parentage (one parent, or both, being of foreign birth) there were:

Irish, 4,913,238; Germans, 6,851,564; English, 1,922,638; Scotch, 540,779; Welsh, 220,540; Canadian English, 939,746; Canadian French, 513,428; Swedes, 726,430; Norwegians, 596,131; Danes, 213,036; Bohemians, 215,514; French, 255,488; Hungarians, 71,519; Italians, 248,601; Russians, 254,635, and of other nationalities, 1,114,088.

Alaska, for some unknown reason, is always pushed out of sight like a poor relation. Its area is set down at nearly 600,000 square miles, with a total population of 32,052. Of these 4,298 were white, 23,531 Indians, 2,288 Mongolians, 1,823 of mixed origin, and 112 classified as "all others."

The whole number of Indians in the United States is 271,784, divided into three categories, as follows:

Civilised Indians (included in census)....................	58,806
Alaska Indians (excluded from census)..................	23,531
Indians of Indian Territory and the Reservations (excluded from census)....................................	189,447
	271,784

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* This word, in the Census returns, includes all, wholly or in part, of negro blood.

In the *Report on Statistics of Churches in the United States at the Eleventh Census, 1890*, also just issued, Table 9 gives the following summary of denominations:

Adventists, 60,491; Baptists, 3,712,468; Brethren (River), 3,427; Brethren (Plymouth), 6,661; Catholics, 6,257,871; Catholic Apostolic, 1,394; Christadelphians, 1,277; Christians, 103,722; Christian Missionary Association, 754; Christian Scientists, 8,724; Christian Union, 18,214; Church of God (Winebrennerian), 22,511; Church Triumphant (Schweinfurth), 384; Church of the New Jerusalem, 7,095; Communistic Societies, 4,049; Congregationalists, 512,771; Disciples of Christ, 641,051; Dunkards, 73,795; Evangelical Association, 133,313; Friends, 107,208; Friends of the Temple, 340; German Evangelical Protestant, 36,156; German Evangelical Synod, 187,432; Jewish Congregations, 130,496; Latter-Day Saints, 166,125; Lutherans, 1,231,072; Mennonites, 41,541; Methodists, 4,589,284; Moravians, 11,781; Presbyterians, 1,278,332; Protestant Episcopal, 540,509; Reformed, 309,458; Salvation Army, 8,742; Schwenkfeldians, 306; Social Brethren, 913; Society for Ethical Culture, 1,064; Spiritualists, 45,030; Theosophical Society, 695; United Brethren, 225,281; Unitarians, 67,749; Universalists, 49,174; independent congregations, 14,126.

The figures represent the communicants or members.

The total number of organizations in the country (including Alaska) is 165,177, with 142,521 church edifices and 23,334 halls, including 47 Chinese temples and 1 hall. The total value of church property was $679,630,139.

The way of the census agent, like that of the transgressor, is hard, and the Introduction presents some of the objections offered by conscientious believers who were asked to supply information. The agent was reminded in several instances that David sinned in numbering Israel, and that punishment came upon him. The Dunkards passed a solemn and ungrammatical resolution against taking part in the matter. A representative of another body referred to the words of Jesus: *My sheep hear my voice and I know them and they follow me;* and added: "He knows His sheep, but me or you don't."

A minister wrote that he belonged to the church of the first born who are written in Heaven, where the class-book, the family register, was kept, and that, having no example from either Christ or the Apostles, his people kept no registry or enrolment.

THE REMOVAL OF PROF. DAVIDSON.—In the early summer of

1895, Prof. George Davidson, one of the most efficient among the many distinguished scientific men who have given character and renown to the United States Coast and Geodetic Survey, was removed from his position at the head of the Survey on the Pacific Coast.

This arbitrary action, unhappily not singular, on the part of the Secretary of the Treasury, roused the public indignation, which expressed itself in the following memorial, laid before the President by the Geographical Society of the Pacific:

To His Excellency Grover Cleveland, President of the United States:

Among the removals from the United States Coast and Geodetic Survey, just announced, is that of Professor George Davidson, for many years in charge of the Survey on the Pacific Coast.

The Geographical Society of the Pacific desires to enter a respectful protest against this removal. Professor Davidson is physically far more active than his years would lead those not acquainted with him to suppose. He is amply able to do duty in the field to-day, and his long experience and well-earned reputation in scientific circles render his services exceptionally valuable to the Coast Survey. Thoroughly familiar with the routine, he is fully qualified to carry on what yet remains to be done along this coast.

We consider it a grave mistake to remove him. One who could devote night after night to taking stellar observations for the United States Government in a cold, damp observatory, from 9 P.M. to 3 and 4 A.M., keeping this up for periods of sixty and seventy consecutive nights, and transact the daily office business of the Survey besides, as the Professor has frequently done within the past three years, can scarcely be called too old for duty. Many men who are twenty years younger than he is could not go through such a physical strain. In reducing the appropriation for his department Congress did not intend to dispense with his services.

As a recognition of his work for the advancement of science the Royal Geographical Society of London elected him an honorary member of their organization. In 1894 the French Government appointed him a corresponding member of the "Bureau des Longitudes" of Paris. This honor has never before been conferred upon an officer of the United States Government. In both instances the action was a compliment to the American people.

And this Society does, therefore, with a view to the benefit of the public service, respectfully ask that your Excellency take such action as may be necessary to restore Professor Davidson to his former position.

RALPH C. HARRISON,
IRVING M. SCOTT,
CHAS. L. TAYLOR.

JOHN PARTRIDGE, *Secretary.*

PRECIPITATION IN THE UNITED STATES IN 1893.—The Report of the Chief of the Weather Bureau for 1893, just issued, contains a tabulated statement of the precipitation, monthly and annual, so far as recorded at the stations throughout the country. In many instances the returns are fragmentary, and these have not been taken into account in the preparation of the following list of averages:

STATE.	NO. OF STATIONS.	AVERAGE. PRECIPITATION.
Alabama........................	35	50.82 inches
(Mobile, 63.42 in.)		
Alaska...........................	2	87.47 “
Arizona..........................	37	11.78 “
Arkansas	35	47.38 “
California......................	281	21.01 “
(San Francisco, 17.91.)		
Colorado........................	70	12.23 “
(Denver, 8.48.)		
Connecticut....................	21	49.31 “
Delaware	3	41.68 “
District of Columbia............	4	36.04 “
(Washington, 36.71.)		
Florida	31	53.51 “
Georgia..........................	40	44.04 “
(Savannah, 61.58.)		
Idaho	8	19.98 “
Illinois............................	44	33.05 “
(Chicago, 27.47.)		
Indiana...........................	35	42.92 “
Indian Territory.................	5	31.50 “
Iowa...............................	65	27.47 “
Kansas	59	19.11 “
Kentucky........................	27	39.86 “
Louisiana	34	49.80 “
(New Orleans, 48.02.)		
Maine	10	40.72 “
(Portland, 43.61.)		
Maryland........................	13	41.07 “
(Baltimore, 32.15.)		
Massachusetts..................	67	44.85 “
(Boston, 41.84.)		
Michigan........................	55	34.86 “
(Detroit, 34.18.)		
Minnesota	42	25.65 “
(St. Paul, 25.95.)		
Mississippi.....................	25	50.36 “
Missouri.........................	68	38.70 “
(St. Louis, 39.33.)		
Montana	14	13.88 “
Nebraska	50	18.87 “

STATE.	NO. OF STATIONS.	AVERAGE PRECIPITATION.
Nevada	35	9.25 inches.
New Hampshire	21	38.21 “
New Jersey	49	47.78 “
New Mexico	19	12.19 “
New York	57	42.76 “
(New York City, 53.01.) (Buffalo, 38.64.)		
North Carolina	38	52.60 “
(Asheville, 46.90.)		
North Dakota	21	16.43 “
Ohio	90	39.52 “
(Cincinnati, 44.00.)		
Oklahoma	9	22.33 “
Oregon	53	41.96 “
Pennsylvania	70	44.02 “
(Philadelphia, 37.65.) Another observer makes the Philadelphia record 45.23.		
Rhode Island	7	49.47 “
South Carolina	20	53.21 “
(Charleston, 70.99.)		
South Dakota	33	18.48 “
Tennessee	29	47.26 “
Texas	58	19.42 “
(Galveston, 35.43.)		
Utah	24	11.46 “
(Salt Lake City, 17.35.)		
Vermont	12	37.79 “
Virginia	32	46.72 “
(Richmond, 46.04.)		
Washington	23	46.57 “
The heaviest precipitation in the United States is 118.88 inches at Neah Bay, Washington.		
West Virginia	22	40.65 “
Wisconsin	43	29.80 “
(Milwaukee, 32.87.)		
Wyoming	10	9.86 “

The Report closes with tables showing the loss of life by violent wind and by lightning for the four years, 1890–1893. The great losses occur in the months from March to September, inclusive, though 21 deaths were caused by wind in November, and 11 in December, 1892. The total of deaths by violent wind in the four years was 1,032, and 784 persons were killed by lightning.

THE MAZAMAS ENTERPRISE.*—The plan of sending a heliographic message from mountain to mountain, between British Columbia and Mexico, on the 10th of July, was partly executed by the Mazamas, and is reported at length in the Portland *Oregonian* of July 21. The operations were limited to six peaks—Mts. Hood, Jefferson and Diamond in Oregon, and Baker, Rainier and Adams in Washington.

The Mt. Baker party failed to reach the summit, and the Diamond Peak party had not sent in a report.

Mts. Rainier, Adams, Hood and Jefferson were successfully ascended, but the atmosphere was charged with smoke and the signals from Rainier and Jefferson were obscured. Communication between Mt. Hood and Mt. Adams was satisfactory for a considerable time, until both summits were hidden by the cloud of smoke, which rose to a height of more than 12,000 feet.

The instruments used were made in Portland, Oregon, after the army model, but with mirrors 6x6 in., instead of 4½x4½ in. The mountings were of aluminium.

One of the objects to be accomplished in the ascent of Mt. Adams was the measurement of its height. This is put at 9,570 feet in most atlases and books of reference.

Twelve boiling-point observations, taken at intervals of 15 minutes, were computed by Mr. Alciatore, of the U. S. Weather Bureau at Portland, and compared with those simultaneously taken in that city. Five separate calculations, with different formulas, gave the following results: 12,255, 12,258, 12,184, 11,966 and 11,952; the average being 12,123 feet.

RAIMONDI'S WORK IN PERU.—Prof. Courtenay DeKalb, of the School of Mines at Rolla, Missouri, in a letter to the New York *Nation*, of July 18, reviewed the life and work of Antonio Raimondi, a man not more remarkable for his amazing industry than for his absolutely unselfish devotion to the cause of science.

He was born at Milan in 1826 and began his career in Peru in 1849. He died in 1890, universally respected, and was interred with imposing obsequies.

In forty years he had laid broad and deep the foundations of a monumental work on the geography and geology, the mineralogy, botany, zoölogy and ethnology of Peru. He travelled in every part of the country, collecting specimens, making astronomical and barometrical observations and accumulating stores of information.

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* See *Bulletin*, No. 2, 1895, p. 176.

Besides the valuable monographs and memoirs which he contributed to the transactions of societies in France and Italy, and 16 sheets of the map of Peru, Raimondi brought out the following books:

El Departamento de Ancachs, in 1873.
El Perú, Vols. 1, 2 and 3, in 1874–1879.
Minerales del Perú, in 1878.

The volume on Ancachs was published through the liberality of Henry Meiggs; the other works by the Peruvian Government. In 1886 the Government assumed the expense of editing, under Raimondi's supervision, and publishing the continuation of *El Perú*, but in the crippled condition of the country after the war with Chile nothing could be done. It was during the war that the Italian Government made an offer to Raimondi to supply him with all necessary scientific aid and collaboration, and to bear the entire expense of publishing his work, if he returned to Italy with his collections. This offer he declined, under a sense of moral obligation to his adopted country.

The collections have been examined by the Geographical Society of Lima.

They contain ample material for the completion of the geography, and folios describing 708 samples of rock, with many analyses, and 2,000 specimens of fossils. In mineralogy there are five folio volumes, with descriptions of 2,994 specimens.

In botany there are 149 folios, with 20,000 specimens, besides 160 full boxes, and seeds, barks, gums, etc., 500 in number, and many coloured sketches for illustration.

The zoölogical collection comprises 1,500 examples of birds, mammals, and reptiles, 4,000 insects and 500 mollusks, and there are 300 objects in the ethnological department.

According to the systematic plan for continuing the work, *El Perú*, when complete, would consist of twenty volumes.

Mr. DeKalb's letter ends with a question that should not be left without a reply:

> Rather than encourage some new enterprise, would it not be a more fitting thing for one or more of our great scientific associations to join hands with the Geographical Society of Lima and the Peruvian people, and secure for the good of the world the fruits of a great life-work, which only needs to receive the finishing touches to render it available? It would surely be an appropriate act of that universal brotherhood of science of which we are wont to hear so much, and which needs to be quickened ever and anon by such deeds of generosity.

THE DUTREUIL DE RHINS EXPEDITION.—M. Fernand Grenard, the companion of the ill-fated Dutreuil de Rhins, made a detailed report of his mission at a meeting of the Paris Geographical Society, held on the 7th of June.

This report fills more than thirty pages of the *Comptes Rendus*, Nos. 11 et 12, 1895.

The explorers left Paris in February, 1891, organized their caravan at Osh, in Russian Turkistan, and started, May 23, on their long journey across Tibet and through China to Pekin.

They crossed the Alai Tagh, bare and desolate, especially on the Chinese slopes, and reached Kashgar, where they met the Russian Consul-General, Petrovsky, and the English travellers, Younghusband and Macartney. On the 7th of July they arrived at Khotan, where the real exploration began. Three campaigns were planned, each of a year in length; the first, to examine the mountains south of Khotan and Polur, and trace, if possible, the ancient road which led directly to Lassa; the second, to cross the mountains and push on to Lake Nam-tso and thence to Hsi-ning; the third, to traverse some districts of Mongolia and to end the journey at Pekin. With some modifications, this general plan was carried out.

Arrived at Polur, Dutreuil de Rhins spent some time searching in vain for a pass through the Altyn-Tagh, and was at last helped on his way by the Chinese sub-prefect of Keria. The party entered the Ustun-Tagh and followed the valley of the Aksu River, which flows between enormous masses of green and red rocks, with peaks covered with snow, as far as the Kukbuyang pass, 5,800 metres (19,029 feet) above the sea, the greatest elevation attained during the journey. From this pass they followed the Keria River till it turned to the north, when they struck off along the foot of the glaciers of the Ustun-Tagh. It was in September, but the altitude was above 16,000 feet, and the temperature, which reached 104° Fahr. at midday, went down to 4° below zero at night. Water was scarce and bad, and the provisions were poor. The men gave out and the horses began to die. There was no game; not even a bird passed in the sky. Worn-out and starved, the party returned to Khotan late in October.

The second year's work met with unexpected obstacles. The remittances of money were delayed, and the amount, when received, was insufficient, and M. Dutreuil de Rhins, remembering the rigour of the climate on the high plateaux, and wishing to avoid the winter, made his start in August, when the melting snows transform the uplands into bogs and marshes. The animals perished, and the day's march, which should have been thirteen miles, was not more than seven or eight. The route was to the south-west. At Lake

Sumji-tso the first Tibetan was met, and not far beyond, in a vast amphitheatre of mountains, a small encampment of his people. They were friendly, but very poor, and the travellers asked for a guide to lead them to some more fertile region. The guide was furnished, but he lost his way in two days, and the explorers, on comparing notes, found that their supply of provisions would just enable them to reach Ladak, the nearest point at which they could be sure of replenishing their stock. They arrived at Leh on the 2d of October, and started on the 20th to cross the Karakoram and return to Khotan, which was reached November 21.

The results of these two years were valuable collections in ethnography and in natural history, and a vast number of meteorological and hypsometrical observations, besides 1,377 astronomical determinations of longitude and latitude.

From Khotan the explorers moved to Tchertchen, about 300 miles to the north-east, and started on the 3d of September, 1893, on their third campaign, following a southerly course. On the 26th they crossed the Arka-Tagh and entered a wholly unknown region, a chaos of lofty mountains, without sign of vegetable or animal life. October 3, they passed a salt lake, 25 miles long, with shores and enclosing mountains of a lively brick-red; and on the 10th they came to an encampment of Tibetan hunters, in a country full of antelopes, wild asses and yaks. A few days later the caravan was overtaken by a snow-storm which lasted nearly a week. The cold was intense, but the highest elevation was passed, and on the 3d of November, the direction of the march was changed to the eastward.

At Bower's lake Garing Cho, where he was turned away by the Tibetans, Dutreuil de Rhins received a message from the prefect of the district, asking for an interview. The explorer turned a deaf ear and pushed on; but the road was bad, and the next day he was overtaken by the prefect with an escort of fifty armed men. He attempted no violence, but declared that he would lose his life, if the Frenchmen passed that way. Dutreuil de Rhins showed his Chinese passport, and the prefect yielded; but on the 2d of December the caravan was stopped a few miles beyond Lake Nam-tso by an officer from Lassa, who announced the coming of a deputation from the city. This soon arrived. It was composed of the Imperial Commissioner's aide, three Chinese officers of the garrison, two Tibetan functionaries and three lamas, all splendidly dressed and extremely courteous in manner. They declared that nothing would give them greater pleasure than to receive the foreigners at Lassa, but they had to obey the inflexible law of the country. The

Tibetans laid the responsibility of the refusal upon the Chinese, and the Commissioner's aide said:

> You and I understand the rules of international courtesy, but nothing can be done with these barbarous Tibetans. If you only had a Pekin passport for Lassa I should open the way for you.

Forty-five days were spent in useless parleying, and then the march was resumed, this time towards the north-east. After crossing the frontier of Tibet, the party strück the most northerly of three commercial roads that lead from Lassa to Ta-Tsien. This was the route travelled by Miss A. R. Taylor, in 1892. On the 15th April the monastery of Tashi-gupa was reached, and here it was hoped to purchase supplies at a fair then open; but the lamas would have nothing to do with the strangers and strictly forbade dealings with them. They were even worse treated at the Kier-ku monastery, where they arrived on the 20th of May, in the middle of a rain, the first they had seen for a year. Their interpreter was pelted with stones and shelter in the village was refused to them.

All the eastern Tibetans were found to be much more inhospitable and violent than those of the west and south. Their fanaticism is unchecked even by the Chinese authority.

Of the three roads which lead from Kier-ku to Hsi-ning, Dutreuil de Rhins chose the shortest and most direct, but also, as the event proved, the most dangerous.

He started on the 1st of June, but missed the way and did not reach the first village, Tau-Buddha, till the next day in a pouring rain, which delayed the march for twenty-four hours. In the night two horses were stolen from the camp, and when inquiry was made for the head men in order to lodge a complaint, the natives refused to say where they could be seen. This seemed to be an occasion for a decided step, and Dutreuil de Rhins took the first two horses that came to hand, announcing that they would be returned as soon as he had had an interview with the head man. The Tibetans fled to their houses and opened fire on the caravan, mortally wounding Dutreuil de Rhins and killing several of the animals. The men of the neighboring villages hurried to the spot and joined in the attack. The ammunition of the caravan was soon exhausted, and the Tibetans rushed upon the party. M. Grenard was abandoned by his men and captured, to be turned adrift at the frontier of the district. He found shelter with a Chinese Consular agent, who informed him that M. Dutreuil de Rhins had been thrown into the river.

At Hsi-ning M. Grenard was kindly received by the Chinese authorities, to whom the Tibetans ultimately forwarded the papers and effects of the expedition.

A MAN WITH A TAIL.—The *Bulletin* of the Paris Geographical Society, for the second quarter of 1895, contains a paper in which M. Paul d'Enjoy, *procureur* of the Republic at Bac-Lieu, in French Cochin China, gives an account of a trip to the Moï country in the spring of 1890.

The name *Moï* is an Annamite word equivalent to *barbarian.* The tribes to which it is applied have lived in Indo-China from the earliest times, and M. d'Enjoy suggests that they are perhaps the monkeys, whose battles with the gods are described in the sacred books of India and represented in the bas-reliefs of the Cambodian temples.

Several districts in the province of Biên-Hoa are inhabited by half-civilized Moïs, subject to the French authority. These people, modified physically and morally by mixture with the Annamite blood, pay taxes, cultivate rice-fields, carry their goods to market and make their purchases in the shops.

The independent Moïs, on the contrary, live an entirely wild life.

They are visited every year, during the dry season, by the Annamite traders, who ascend the Dong-Naï in their boats, laden with red cotton umbrellas, glass beads and ornaments, blankets, and above all with bottles, cracked pots and broken pitchers, and exchange these articles for resin, woods and gums, ivory or gold dust. So long as the trading is fairly conducted there is nothing to fear; but if there is cheating, the savages take a bloody revenge. One day M. d'Enjoy was called upon to try two Moïs who had been concerned in the murder of four Annamites. The Moïs were powerful men, with long hair and beards and nail-like talons, and their ankle-bones stood out like the spurs of a cock. They wore a red cord round the waist, and bracelets made of rattan. They refused to prostrate themselves before the "mandarin" and they admitted the charge against them without hesitation, nor could they be made to understand that they had done anything wrong. "A man that kills," they said, "may kill, because he kills." When told that they would be locked up, to begin with, they clapped their hands, and replied:

> We were never so happy. No chief could dream of a finer house than the prison, and only to stay there for the rest of our lives we are ready to kill anybody for you.

M. d'Enjoy entered the country of these wild men just beyond Tri-An. The first village, in the unbroken forest, was composed of a single habitation in the form of a long tunnel made of sticks meeting at the top like the sides of the letter A and covered with leaves. This tunnel was 150 feet long, a little more than three feet high and six or seven feet wide at the base of the triangle, and it was open at each end.

The children, playing outside, set up a cry at the sight of M. d'Enjoy and his party, and at the sound a number of naked, wild-looking creatures rushed out of the tunnel and took to the woods like so many monkeys. M. d'Enjoy and his men were at the foot of a great tree, where a Moï was engaged in gathering honey. Alarmed by the flight of his companions, this man descended rapidly, stepping on the bits of wood which he had driven into the tree till he was about fifteen feet from the ground, when he made a spring and rushed, with his head down, to break through the circle about the trunk; but he was captured.

In the tunnel were found bamboo pipes, polished stones, copper bracelets and pearl necklaces.

With some difficulty the prisoner was induced to talk. The village belonged, he said, to the Leos, a warlike tribe, who fled at the sight of the strangers, because they took M. d'Enjoy, in his long white dress, for the demon of the moon.

The Moï had an oval face, with a long nose and smooth hair. He was tall and well made, with vigorous limbs, and he looked like a bronze statue. His ankle-bones were enormous, like those already noticed, and he had a tail. M. d'Enjoy says:

> This discovery stupefied me. I approached him, and to be certain that I was not the plaything of an illusion I felt with my hand his caudal appendage. I satisfied myself in this way that the vertebral column of the Moï was prolonged beyond the body by three or four vertebræ so as to form a little tail like that of a Faun.*

The prisoner turned round and said, drawing a long sigh, that once all the Moïs had tails. The tail was a mark of the pure race, and it was becoming rarer with every generation since the day when the Moï king, whose tail was three cubits in length, had been driven from the rich plains of his ancestors.

The savage then recited a long poem, which the interpreter was not able to follow. Water and wine and spirits were offered for refreshment, but in vain; the Moï quenched his thirst with the juice of a liana. At nightfall a guard was set to watch him, but in the morning the prisoner was gone and the guard was delirious with fever. In a lucid interval he told how he had been led to drink the juice of a liana. The fever was so violent that M. d'Enjoy determined at once to return to Biên-Hoa, where the sick man recovered, though his faculties were for a long time dulled.

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* Cette découverte me stupéfia; je m'approchai de lui et pour être certain que je n'étais pas le jouet d'une illusion, je tâtai l'appendice caudal du sauvage.

Je constatai ainsi que la colonne vertébrale du Moï se prolongeait extérieurement au buste, de trois ou quatre vertèbres pour former une petite queue de faune.

Circumstances have interfered with M. d'Enjoy's purpose to make more extended explorations in the Moï country, but it is to be hoped that he will not resign himself to inactivity. A man with a tail is no slight trophy to bring back, on paper, from a brief excursion; but a living Moï with prolonged vertebral column, safely landed at Biên-Hoa, or still better at Saïgon, would be a pearl of price. It is true that the liana juice is a serious obstacle in the way, and yet the timely exhibition of chloroform to the savage would work wonders.

THE LEOPOLDINISCH-CAROLINISCHE AKADEMIE, HALLE a/S, announces the death of its president, the Government Privy-Counsellor Prof. Dr. Hermann Knoblauch, at Baden-Baden, on the 30th of June, 1895, in the seventy-sixth year of his age.

JOSEPH THOMSON, the well-known explorer of Central Africa, died on the 2d of August, at the early age of thirty-seven years. He was born and educated in Scotland, and began his African career as geologist of the Royal Geographical Society's expedition to Central Africa, under the conduct of Keith Johnston, in 1879. On the death of the leader within a few months, Mr. Thomson took charge of the party and returned to Zanzibar in a year, having done much good work.

In 1883–84 he explored Masai-Land for the Royal Geographical Society, and received their Founder's medal. He afterwards visited the Central Sudan and Morocco, where he twice crossed the Atlas range.

His latest journeys in British Central Africa were interrupted by failing health, which finally gave way.

With rare qualifications for the explorer's task, Mr. Thomson possessed uncommon tact and patience in dealing with uncivilized races, and it is to be remembered to his honour that he never found it necessary to resort to bloodshed.

SIXTH INTERNATIONAL GEOGRAPHICAL CONGRESS.

The Congress was opened at the Imperial Institute, London, on the 26th of July, with addresses by the Duke of York and by Mr. Clements R. Markham, President of the Royal Geographical Society and of the Congress. These addresses were acknowledged, on behalf of the foreign delegates and members, by ex-Chief Justice Daly, President of the American Geographical Society, and then followed a reception, held in the gardens of the Institute.

M. E. Levasseur opened the discussions with a paper on Geography in Schools and Universities. Prof. Lehmann, Mr. Yule Oldham, Mr. Herbertson, Mr. Mackinder and others spoke on the subject, and a committee was appointed to draft a resolution in favour of improved methods of geographical teaching.

The Scientific Exploration of the Antarctic Regions was the subject treated by Dr. George Neumayer, who recommended international co-operation in the work and the simultaneous advance of three expeditions along the meridians of New Zealand, Cape Horn and Kerguelen Island.

Admiral Markham spoke on Arctic Exploration, and expressed the opinion that the route by Franz Josef Land offered better prospects than any other.

Gen. Greely, in a paper on the Scope and Value of Arctic Exploration, distinguished its three phases: the commercial, which ended with the last century; the geographical, which culminated with the expeditions in search of Franklin, and the scientific, which now prevails. It could be proved, he said, that Arctic industries had contributed £250,000,000 to the wealth of the world.

Mr. S. A. Andree described his plan for reaching the North Pole by Balloon. The start will be made in June, 1896.

Gen. Walker explained the operations of the Trigonometrical Survey of India, and M. Charles Lallemand read a paper on the general levelling of France.

Gen. Sir Charles Wilson presented the report of the committee appointed by the Berne Congress, in 1891, on Prof. Penck's plan for a map of the world on the scale of 1:1,000,000. The report recommended a projection according to which the limits of the sheets would be formed by parallels and meridians. A truncated-conical projection was the only one which could be taken into consideration. The sheets would cover 4 deg. in height and 6 deg. in breadth, and for the regions within the Polar circles 12 deg. in breadth. The committee unanimously recommended for the map the adoption of the meridian of Greenwich and the employment of the metre for the altitudes. The recommendations were unanimously approved.

Prof. Brückner, on behalf of the Geographical Society of Berne, offered a resolution that the official staff of each Congress should act until the meeting of the following Congress. The resolution was adopted.

A paper devoted to a review of the work in oceanography during the past twenty years, and especially to the results of the *Challenger* expedition, was read by Mr. J. Y. Buchanan, who also presented, in the name of the Prince of Monaco, an account of the scientific cruises of the yacht *Princesse Alice.*

Prof. Wm. Libbey, Jr., presented the results of his observations on the Relations of the Gulf Stream and the Labrador Current.

Sir John Kirk read a paper on the Extent to which Tropical Africa is suited for Development by the White Races or under their Superintendence. So far as climate was concerned, he considered that the higher lands, above the level of 5,000 feet, were suitable for colonization, and that the fevers were so mild that they did not offer an obstacle. As a rule, the healthy plateaux of Africa were fertile, and some were rich in minerals. His survey excluded, as unsuitable, all the western coast, including the Congo State. German South-western Africa, perhaps, British South-eastern, and East Africa and the mountainous districts of Abyssinia are regarded as promising fields.

Mr. H. M. Stanley, M.P., agreed with Sir John Kirk, but thought his paper looked too far ahead. There was no intention to colonize Central Africa, but there was a purpose to extend commerce, to improve the black man, and to make colonization possible in the distant future. The steamers on the Congo and railroads would do a great part of this work. He believed that in time Central Africa would be like Mexico and Brazil and Ceylon, and he made light of the fever, affirming that he had been in a certain State in the United States where there were more fevers in twenty-four hours than could be found in any part of Africa. The subject was further discussed by Count Pfeil, Mr. Ravenstein, Mr. Silva White and M. Dècle, and the President then called upon Colonel Slatin Pasha, who gave the following account of his captivity in the Sudan and his escape:

In the middle of Africa lies the former Egyptian Sudan, now under the rule of Caliph Abdullah, the despotic head of the Mahdists. No European can venture to cross the limits of this land, cut off from civilization, extending in the south along the Nile to Redjaf, and east to west from Kassala to near Wadai. Death or life-long captivity would be his lot. Yet it is only within the short period of ten years that the land has been subjected to this miserable fate. For more than sixty years, since the time of Mohammed Ali, it remained under the rule of Egypt, and was open to civilization. In the chief towns were found Egyptian and European merchants; in Khartum itself the foreign Powers had their representatives. Travellers of all nations could pass through the land unharmed, and found protection and help through those representatives. Telegraphs and a regular postal service facilitated intellectual intercourse with the most distant countries. Mohammedan mosques, Christian churches, and mission schools looked after the religious and moral education of the young. The land was inhabited by the most diverse tribes, many of which lived in hostility with one another, but were compelled by the severity of the Government to keep the peace. Discontent, no doubt, prevailed in the land. Its cause was to be sought in the avarice of the officials, especially of the native Sudanese, who latterly had acquired high positions, and by their oppression and tyranny enriched themselves as quickly as possible, and also in the ignorance of the country on the part of the Europeans, who, often with the best intentions, issued orders directly contrary to the traditions and views of the Sudanese, which could not but excite ill will. Mohammed Ahmed knew and took advantage of the mood of the country. Well knowing that only a religious factor could unite the hostile tribes, he maintained that he was the Mahdi sent by God, the deliverer of the country from a foreign yoke, the regenerator of religion. He roused the tribes to war against the Government, promised his adherents in case of death the everlasting joys of Heaven, in case of victory four-fifths of the booty to the survivors. Thus were fanaticism and avarice, the two chief qualities of the Sudanese, awakened. The spark grew to a bright flame. Victory after victory was gained by the insurgents. Kordofan fell into their hands. The army sent under Hicks for the reconquest of the land was annihilated, and I was compelled, after long and vain struggles, to surrender. The insurgents marched on Khartum. On arriving in the neighbourhood of that town I had chains put round my neck and feet, since I was suspected of being anxious to make my escape and join General Gordon. The town was besieged. The personal valour and energy of General Gordon were spent in vain in endeavouring to avert the coming calamity. Khartum fell on the 20th of January, and with it the bravest of its defenders, General Gordon himself, who was murdered on the highest steps of his palace. His head was severed from his body and was mockingly shown to me as I lay in irons. The fanatics behaved with fury in the conquered town. Men and women were killed, with few exceptions, and the survivors were maltreated and tortured with the most refined cruelty in order to extort from them information as to the place of concealment of property they might have hidden. Only young girls and pretty women were spared—not out of compassion. They did not wish to lose them, nor to torture them, as thus their beauty would have been impaired and their value diminished. They were distributed among the adherents of the Mahdi—among them many Christian women and girls. After the retreat of the English army from Dongola I was permitted, after nearly eight months of captivity, a certain amount of liberty, on condition that I should never leave the Caliph Abdullah ebn Mohammed, and that I should always remain in his immediate neighbourhood as his moulazim (body guard). Two circumstances induced him to watch me closely. As I was the last living military governor, he believed, in his entire ignorance of the political conditions of European countries, that in case of my escape I should be in a position through my more accurate knowledge of the country to induce the Egyptian or English Government to take hostile measures against the Sudan. On the other hand, it flattered his vanity to have as his servant his former master, one to whom most of the western Arab tribes, and among them his own allies in blood, the Taascha-Bazara, had been subject. Severe and cruel, he trusted no one and governed despotically, solely according to his own good pleasure. Since he is of the tribe of the Taascha-Bazara (that is the name applied to all the nomadic rearers of horned cattle) and belongs to Darfur, he relies, as a stranger in the Nile valley, only on his kinsmen by blood, the western Arab tribes and armed slaves, while he sought to diminish the strength of the native tribes of the Nile valley, the Gjaaliin and Danagla. By disarmament, confiscation of property, executions, and the despatch of those capable of bearing arms against his enemies, so that they might die in battle or through privations, he has so weakened these tribes that they are now compelled to endure his rule. The greater part of them regret that they have been stirred up by fanaticism or on other grounds to rise against the former government. They now understand that the government has only been changed, that religion served only as a flag, as a means for the attainment of the end desired. They now long for the end of the tragedy which they have themselves brought upon the scene. Only after eleven years' captivity did I succeed in gaining my freedom. Although all intercourse with any one was forbidden to me, I was nevertheless in secret relation with tribes of the country formerly known to me. For years and on several occasions I had determined on flight, but those participating in my attempts were always deterred by the dangers of the undertaking. At the close of last year I sent a man to Cairo, and through the intervention of the Austrian Consul-General, Baron Heidler, and Major Wingate, Director of the Intelligence Department for Egypt, he received the necessary means for my flight out of the money deposited by my relatives. By means of a large sum secured to him by contract in the event of the success of the undertaking, he gained over people to venture their lives in delivering me. On the night of February 20, after the Caliph had gone to rest, I left the town unobserved and reached the camels held in readiness in the steppe. My guides, knowing that they had only a few hours' start, forced their pace. After an unbroken ride of twenty-one hours we had accomplished one hundred and thirty miles, but the exhausted animals refused to go farther. For six days I remained hidden in the inhospitable Gilf Mountains, until my guides, who were Arabs of this district, succeeded in obtaining other camels. At first it had been our intention to make good our escape by travelling as quickly as possible, but now the only chance of success was strategical manœuvring, as all routes were closely watched by the dervishes, who had overtaken us. However, we succeeded in crossing the Nile near Berber and reaching the Etbai Mountains by a roundabout way. Here my last guide, an old Arab, fell ill, and I was compelled to leave him behind, together with the only camel which was still in my possession. Now commenced the worst part of the whole journey, as I had to proceed on foot. But the hope of freedom enabled me to overcome all difficulties. On March 16 I left the mountains and reached Assuan, the first settlement of civilized men. My feelings at that moment were indescribable. I was saved from my enemies, from the hands of a fanatical despot, and had left behind me a country governed by absolute and arbitrary tyranny, and separated completely from any civilization. Behind me was the Sudan, where so many Christians are still kept in bonds of slavery and where the greater part of the population prays to God for liberation. I reached Cairo by steamer on March 19. Everywhere I received tokens of the most sincere sympathy with my fate. Standing now here, in the middle o civilized society, again a man among men, my thoughts turn often back to the fanatical barbarians with whom I had to live so long, to my perils and sufferings amongst them, to the unfortunate companions of my captivity, and to the enslaved nations of those remote territories. My thanks are due to God, whose protecting hand has led me safely through all the perils behind me.

Mr. C. E. Borchgrevink, a young Norwegian, read a paper on the Voyage of the *Antarctic* to Victoria Land. In order to join the *Antarctic*, which was a whaling vessel, he had been obliged to ship as a common sailor, and had been able, therefore, to take with him only a few instruments. The vessel left Melbourne September 20, 1894, and the story of her voyage is as follows:

On October 18, while steering for Royal Company Islands, they had snow on board for the first time. At night it was moonlight, and at 12 o'clock the aurora australis was visible for the first time, with white shining clouds rolling from west towards east. It formed into a shining ellipse, with an altitude above the southern horizon of 35 degrees. The *Antarctic* was at that time in the vicinity of Macquarie Island, and thus in latitude about 34 degrees south. The aurora seemed constantly to obtain its light force from the west, and the intensity of its light cloud culminated every five minutes, after which it suddenly died out, to regain its former magnificence and beauty during the succeeding five minutes. The phenomenon lasted till 2 o'clock, when it was gradually lost in an increasing mist. They set out for Campbell Island on the 22d, and dropped anchor in North Harbour on the eve of October 25, shifting the following day to Perseverance Harbour, where they filled their water tanks and made their final preparations before proceeding south. On October 31 they weighed anchor, and during the next few days, proceeding further into the fifties, the air and the water kept an equal temperature at 44° F. On the 6th of the following month, in latitude 58° 14′ and longitude 162° 35′, they sighted an immense barrier of ice, or chain of icebergs, extending no less than from forty to sixty miles from east to northwest. The top was quite level and absolutely white. The highest point was 600 feet high. The perpendicular sides were dark ashy gray, with large worn green caves, in which the furious waves were raging and tearing, bursting forth in brilliant foam hundreds of feet up in the air. Numerous icebergs were floating about in all directions, and were undoubtedly children of this enormous monster. It was here they discovered that their propeller was out of order, and the *Antarctic* was again headed northward, anchoring in Port Chalmers on the 18th, where the damage was soon repaired. They again stood southwards on November 28. By the time they reached 55° the albatross had left them and likewise the Cape pigeon, but the white-bellied storm petrel still followed in their track. On December 7 they sighted the edge of the pack ice and shot their first seal, which was of the white kind. On December 8, in latitude 68° 45′, longitude 171° 30′, large streams of ice were drifting around them. A strong ice-blink appeared towards the south, and the presence of the elegant white petrel gave unmistakable evidence that now they had before them those vast ice-fields into which the gallant Briton, Sir James Ross, on January 5, 1841, successfully entered with his famous ships *Erebus* and *Terror*. In the evening the *Antarctic* slowly worked its way through the edge of the pack ice, which consisted of large and heavy hummocky ice. Of marine animals they saw multitudes. The large-finned whale, known in Norway as the blue whale, were spouting about in all directions. The white petrel were numerous here. The white-bellied petrel de parted at the edge of the pack, leaving the icy regions to its darker, hardier brethren. They shot several seal, but seldom saw more than one or two together and never more than seven, most having scars and scratches in their skin. When the ship entered the pack the temperature of the air was 25°, that of the water 28°, which latter held all through the pack. On the 14th they sighted Balleney Island, and found it, as according to Ross, in latitude 66° 44′, longitude 164°. The icefloes grew gradually larger as they approached land, and it was evident that the icepack then around them was for a great part discharged from the glaciers of the Balleney. They got a good view of the lofty peak of the Balleney, which rose to a height of 12,000 feet above the sea level. On December 16 they moored the *Antarctic* to a large floe of pancake-like ice, which told its tale of the previous long calm. On December 24 they were in latitude 66° 3, longitude 167° 37′ east. During the day they had stormy weather, but the evening was beautiful and the sun just touched the horizon on its lowest descent. They were probably the only people who ever saw the midnight sun on Christmas Eve. On Wednesday, the 26th, they crossed the Antarctic Circle. On New Year's Eve they were in latitude 66° 47′, longitude 147° 8′ at 12 o'clock. While the sun was shining bright, they rang the old year out and the new year in, and saluted with their guns in honour of the occasion. In latitude 67° 5′, longitude 175° 45′ east, was secured a specimen of *Apterodytes Forsteri*, a large penguin. In all only four of these birds were secured, and it was never seen in company with another of its kind. On the 14th, in latitude 69° 55′ and longitude 157° 30′ east, they came again into open water, having spent thirty-eight days in working their passage through the pack ice. They steered straight for Cape Adare, on Victoria Land, which they sighted on January 16. On the 18th, in latitude 71° 45′, longitude 176° 3′, the temperature of the air was 32° and the temperature of the water 30°, and the sky was completely clear. The Cape, which was in 71° 23′ and 169° 56′, rose to a height of 3,779 feet, and consisted of a large, square, basaltic rock with perpendicular sides. From there they saw the coast of Victoria Land to the west and south as far as the eye could reach. It rose from dark, bare rocks into peaks of perpetual ice and snow, 12,000 feet above the level of the sea, Mount Sabine, above the rest, standing out shining in the rays of the midnight sun. Conic tops covered the plateau and ran over in mighty glaciers. They counted as many as twenty of them in the close vicinity of the Bay of Adare. On the 18th they sighted Possession Island, with its peculiar contours standing out sharply against the bright sky. They effected a successful landing on the North Island, pulling their boat upon the shore, and they were at once furiously attacked by the penguins, which covered the very ground of the island and seemed much annoyed by seeing the foreigners intruding on their domain. Their hoarse screams filled the air, and it was with a considerable strain of his voice that, on landing, he addressed his countrymen in a few words, informing them that they were the second party who had set foot on that island, and that Sir James Ross had preceded them, having fifty-four years ago landed there and planted the English flag. They gave three cheers for that great British navigator, and also for Commander Captain Svend Foyn, who so bravely sent out that present Antarctic expedition. The ground on the island was covered with a deep layer of guano, which, in time, might prove very valuable to Australasia. The island consisted of volcanic, vesicular lava, rising in the south-west into two pointed peaks of 300 feet in height. He scaled the highest of these and called it Peak Archer, after Mr. A. Archer, M.L.A., of Rockhampton, Queensland. To the west the island rose gently upward, forming a bold and conspicuous cape, which, not being named by Sir James Ross, it was left to him (Mr.

Borchgrevink) to christen. He gave it the name of Sir Ferd. von Mueller, whose scientific fame he already as a boy had learnt to value on the Continent. He quite unexpectedly found vegetation on the rocks, about 30 feet above the sea level. Vegetation never was discovered in such southern latitudes before. Possession Island was situated in latitude 71° 56′, longitude 171° 10′. It was remarkably free from snow. He judged it to be from 300 to 350 acres in size, and they gave it the name of Sir James Ross's Island. On February 20 they steamed southwards, and sighted Colman Island on the 21st, at midnight. Finding the eastern cape of this large island unnamed, they called it Cape Oscar, in honour of his Majesty the King of Norway, whose birthday it happened to be on that day. He noticed great irregularities in their compass at Colman Island. Undoubtedly that island contained secrets of scientific value, which would be well worth the attention of future Antarctic researches. On the 22d they were in 74° south. No whales appearing, it was decided to head northwards again, although they all regretted that circumstances did not permit them to proceed further south. On the 23d they were again at Cape Adare. They landed that night, being the first human creatures who ever put foot on the mainland. The penguins were, if possible, even more numerous here than on the Possession Island, and they were discovered on the very cape as far up as 1,000 feet. In latitude 66°, longitude 172° 31′, they ran into open water again, having this time only spent six days in the ice pack. On the 17th of February the Aurora appeared stronger than he ever saw the Aurora Borealis. It rose from south-west, stretching in a broad stream up towards the zenith, and again towards the eastern horizon. The *minimum* temperature within the Antarctic Circle which they experienced was 25° F., the *maximum* being 46° F. The average temperature for January and February kept very much the same. The temperature of the water kept at 28° F. all through the ice pack, always rising one degree where a larger sheet of water broke the ice fields. In the large bay at South Victoria Land the temperature kept constantly about freezing point. It was evident that a warm, north-running current existed in the bay, which undoubtedly had a constant direction northwards, and broke the ice fields at the very place where first Sir James Ross and then they successfully penetrated to the open bay of Victoria Land. Within the Antarctic Circle the barometer at 29° always indicated calm, beautiful, clear weather, and even down to 28° it kept fine. This low barometric indication was remarkable where the dryness of the air should help in causing a high pressure. The movement of the ice distinctly pointed to a north-easterly direction, and the scarcity of ice in the Bay of Victoria Land was undoubtedly not alone owing to warm currents, but also to the protection which the bay had against drift ice by the shore from Cape Adare down to the volcanoes, the Erebus and Terror. A particular specimen of rock which he picked up, composed of quartz, felspar and garnet fragments, held out some hope that minerals of economic value might occur in those regions. He made a thorough investigation of this landing-place, because he believed that here was the very place where a future scientific expedition might stop safely, even during the winter months. Several accessible spurs led up from the place where they were to the top of the cape, from there a gentle slope led on to the great plateau of the South Victorian Continent. The presence of the penguin colony, their undisturbed old nests, the vegetation on the rocks, and the flat table of the cape above, all indicated that here was a place where the unbound powers of the Antarctic Circle did not display the whole severity of their forces. Neither ice nor volcanoes seemed to have raged on the peninsula at Cape Adare, and he strongly recommended that a future scientific expedition should choose this spot as a centre for operations. At this conspicuous cape there would, in his opinion, be ample opportunities for making meteorological observations, and scarcely any branch of science demanded research more than meteorology within the Antarctic Circle. He himself was willing to be the leader of a land party to be landed either on the pack or on the mainland near Colman Island, with skier, Canadian snow-shoes, sledges and dogs. From there it was his scheme to work toward the South Magnetic Pole, calculated by Ross to be in 75° 05′ and 150° east, and Colman Island lying in 73° 36′ south and 170 02° east, he would have approximately to travel about 160 miles to reach the South Magnetic Pole. If it were the means of determining the periodical changes in the Pole of terrestrial magnetism alone, a future expedition would, from a scientific point of view, be an entire success. As to the zoölogical result of future research he expected great discoveries. It would indeed be remarkable if in the unexplored Victoria Continent, which probably extended over an area of 8,000,000 square miles, or about twice the size of Europe, there should not be found animal life hitherto unknown in the Southern Hemisphere. It was true that the scientific results of this expedition had been few, but where already so many important facts demanded further research the arguments plainly proved that the time was ripe and that further delay of a scientific expedition to South Victoria Continent could scarcely be justified.

After some discussion, Prof. von den Steinen offered, and the Congress unanimously adopted, a resolution that

The Sixth Geographical Congress, assembled at London, 1895, with reference to the exploration of the Antarctic regions, expresses the opinion that this is the greatest piece of geographical exploration still to be undertaken, and, in view of the additions to knowledge in almost every branch of science which would result from such scientific exploration, the Congress recommends that the several scientific societies throughout the world urge, in whatever way seems to them most effective, that this work be undertaken before the close of this century.

A paper by Baron Nordenskiöld on Ancient Charts and Sailing Directions was read by the President.

The Origin of the Mediæval Italian Nautical Charts was the subject of a learned paper by Prof. Hermann Wagner, and Mr. H. Yule Oldham called attention to the Importance of Mediæval Manuscript Maps in the Study of the History of Geographical Discovery.

Prof. Rein described his Observations on the Spanish Sierra Nevada, a little known and most interesting range of mountains.

Gen. Annenkoff then addressed the Congress on the Importance of Geography in view of the present Economical and Agricultural Crisis.

It was decided to accept the invitation of the Geographical Societies of Germany to hold the next Congress at Berlin.

Other resolutions adopted were:

That it is desirable to bring to the notice of the geographical societies interested in Africa the advantages to be gained—(1) By the execution of accurate topographical surveys, based on a sufficient triangulation, of the districts in Africa suitable for colonization by Europeans; (2) by encouraging travellers to sketch areas rather than mere routes; (3) by the formation and publication of a list of all the places in unsurveyed Africa which have been accurately determined by astronomical observations, with explanations of the methods employed; (4) by the accurate determination of the position of many of the most important places in unsurveyed Africa, for which operation the lines of telegraph already erected, or in course of erection, afford so great facilities.

One submitted by Dr. Gregoriev, on behalf of General Tillo, St. Petersburg, expressing the importance of drawing up tabular and cartographic catalogues of all the original topographical sources for all the countries and for every geographical region, and expressing a wish that all countries which have not published cartographic catalogues should be invited to do so, and that the geographical societies of the different countries should be invited to interest themselves in the matter.

A resolution concerning the results of recent research in the Baltic, the North Sea and the North Atlantic, especially with regard to fishing interests, and recording the opinion of the Congress that the survey of those areas should be continued and extended.

A resolution acknowledging the necessity of an international system of stations for the observations of earthquakes.

It was agreed that the various geographical societies should be requested to study the question of the orthography of geographical names, and prepare a report on the subject for the next Congress.

A resolution, proposed by Mr. Frank Campbell, expressing approval of the principle of State-printed registration of literature as the true foundation of national and international bibliography, and approving of the appointment of an international committee to further that object.

A resolution, submitted by M. Jacques Léotard (Marseilles), expressing the wish that all geographical maps should bear henceforth the date of their publication.

On the motion of M. De Rey Pailhade, it was agreed to request the various geographical societies to study the subject of the application of the decimal system to time and to angles, and of a symbolical system of hour-zones, and report to the next Congress.

THE NORTH GREENLAND EXPEDITION.*

The steamer *Kite* arrived at St. John's, Newfoundland, on the 21st of September, bringing Mr. Peary and his companions, Matthew Henson and Hugh Lee, from their two years' exile in North Greenland, a period marked by steadfast devotion to duty, and unfaltering courage in the face of accumulating dangers. Like so many other heroic enterprises in the far North, this also has met with undeserved defeat. The story of the past year is told in the following letter reprinted from the New York *Sun*, of September 22:

ST. JOHN'S, N. F., Sept. 21.—The third night after the *Falcon* left me off the Petawak Glacier I camped near the head of Olriks Bay, in Inglefield Gulf, to hunt deer. We had encountered but little ice, and the voyage northward to Inglefield Gulf in a whaleboat had not been arduous. A short stop was made at the Bird Cliffs of Saunders Island to shoot.

We reached Olriks Bay just in time to escape a furious southeaster of three days' duration, which kept my hunters imprisoned under the shelter of rocks unable to get back to camp. The whaleboat had to be nearly filled with stones to prevent its being blown away. We reached Anniversary Lodge [Peary's headquarters at the head of Bowdoin Bay, Inglefield Gulf], on September 6, with five hundred pounds of venison, birds and hare. Bowdoin Bay was a chaos of icebergs and large pans of ice cemented by heavy young ice. The boat was left several miles from the Lodge. Evidently the season would be very short. There was no time to be lost in obtaining my winter's supply of meat and getting it to the Lodge before navigation closed.

I had intended immediately upon my return to take Mr. Lee and the natives with me to Kangardluksoah hunting, but his lonely, anxious vigil during my absence had left Lee in no condition to go or to be left alone again. Matt Henson left with the party of natives twenty hours after our arrival, and returned on September 16, with six deer and several hare. On the following day, with Lee, I went to Karnah [near the entrance to Bowdoin Bay], whence I took my other whaleboat and all the able-bodied native men in the settlement to Cape Cleveland, hunting walrus. The natives, with a boat I had loaned them, had already killed twenty, and the animals were becoming somewhat shy, but I harpooned and secured seven before the rapidly forming young ice compelled a retreat.

The young ice and the head wind delayed our return until September 27, when one boat load of meat was landed at Anniversary Lodge. A second load was landed on September 30. These two days and one while I was at Cape Cleveland were the only days during the season when the whaleboat could reach the Lodge without being dragged over the ice. On October 1 the bay was frozen over for the winter.

September was cold and stormy. The winter's meat supply for ourselves and the dogs being assured, my caches of provisions on the ice-cap next demanded our attention. Two days after the last load of walrus had been secured, Mr. Lee, with Matt Henson and the native Huktah, left the Lodge to dig out these caches and rebuild them for the winter.

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* See the *Journal* of the AMERICAN GEOGRAPHICAL SOCIETY, Vol. XXVI, 1894, pp. 397-406.

Four days later they returned and reported their inability to find the caches owing to the extraordinary depth of new snow on the ice-cap. This was very serious news, and after the dogs had been thoroughly rested and fed I started myself for the ice-cap with Henson and one Eskimo. As we reached the vicinity of the first cache it began snowing, rendering immediate search impossible. The Eskimo, fearful of a storm, slipped away unobserved and started back for the Lodge, which he reached four days later, weak from hunger and half frozen. Henson and I were imprisoned in a tent for six days, when the storm ceased.

Standing at the entrance of the tent, the accumulation of new snow was level with my eye. The actual snowfall on a level was three and a half feet. Two days were spent in an exhaustive but vain search for the caches, all buried, irrecoverable, lost in the snow. I felt like a man shipwrecked and cast away on a desert shore with only the clothes on his back. I must begin again at the very bottom, with the previous season's work blotted out entirely. Nearly all my biscuit and milk, all the compressed pea soup, and every ounce of two fundamental items of an Arctic sledge's equipment, rations of pemmican and alcohol, in all a ton and a half, were gone. The chances were ten to one against accomplishing anything under such an enormous handicap.

Returning to the Lodge on October 20, I found the entire land buried as I had never seen it before. The following days were gloomy ones at the Lodge. The idea of giving up that for which we were there never occurred to us, but the question how to accomplish our object remained unanswered.

The sun was seen for the last time on October 23. During the remainder of October and November five more deer were added to our stock. The preparation of the house for the winter was completed. Several short sledge trips were undertaken, and a general plan of campaign and scheme of equipment and rations for the spring march were decided upon and two sledges were completed. Reindeer meat for ourselves and walrus for the dogs must take the place of pemmican. Coal oil must serve as a substitute for alcohol. I had nothing with which to replace the invaluable pea soup, only 130 pounds of biscuit in tins and less than two cases of milk. The necessary amount of the biscuit must be made up from bulky ship's biscuit in open boxes, and by going without milk during the winter we would have a little more than half a ration for the ice-cap journey.

The light of the December moon was utilized for a sledge trip to Cape York, with Mr. Lee as my companion. Stormy weather delayed us so much that on our return we ran short of provisions, and the last march, from Saunders Island to the Lodge, was a forced one of forty-six hours without food or sleep. Off Cape Parry, while travelling on young ice, we had a narrow escape from a mishap, a large berg disrupting near us and breaking up the ice on which we were travelling.

The holidays were uneventful, and but for the presence of many natives from Karnah, the nearest and this winter the largest of all the native settlements, they would have been among the bluest of our winter days. During the January moon I made a five days' trip to various settlements on the Sound. Lee and Henson also made shorter journeys, but most of the time was occupied in work on our equipment. February and the first half of March were devoted to the same work, relieved by two or three deer hunts and sledge trips to various settlements on the Gulf for material for clothing, dog harness, and so on.

The sun was seen for the first time on February 17. The latter part of the month Mr. Lee returned from a trip to Robertson Bay [on the coast of Baffin's Bay north of the camp] in bad condition and was laid up for two weeks or more. On March 12 Matt Henson started south for Wolstenholme Sound and Petawak Glacier to purchase dogs. The week following his departure I utilized in sledging supplies to the moraine, and on March 20 met him at Peterawick on his return. Sending Henson home to rest, I remained at Peterawick five days purchasing dogs and walrus meat and engaging men to go on the ice-cap. On March 27 I reached the Lodge again with a cavalcade of nine sledges carrying my purchases. I found Mr. Lee nearly recovered.

The next four days were occupied in transporting the sledges to the moraine, fitting out four Eskimos who were to accompany us with suitable gear, and putting the last touches to our own outfit. All my records, journals and valuable papers were deposited under the house, where I hoped they would be safe from fire and prying natives. The remaining provisions and more valuable articles were taken into the house, and leaving everything to the honesty of my native friends, in whose hands I left letters to cover the contingency of our non-return, we were ready to start.

On Monday, April 1, I left Anniversary Lodge with Mr. Lee, Henson, six Eskimos, and sixty-three dogs. Two of the Eskimos were to accompany us only for the day. The other four, forming the supporting party, would accompany us as far as the site of the previous season's pemmican cache, 124 miles distant on the inland ice. The day was clear and calm. The material on and at the edge of the ice-cap was divided into six loads, and we made an advance of twelve miles. Mr. Lee was not in such a condition as I could have wished, but with Yankee grit he insisted on going, and I believed it to be better for him than remaining behind alone. The following three marches were interrupted by further, but, with one exception, unsuccessful searches for the lost caches. Six inches of a seven-foot pole, marking the equinoctial camp, still projected above the snow. The discovery of this cache enabled me to replace my miscellaneous packages of ship's biscuits with sealed tins and complete my milk ration. This cache and the bamboo pole ten miles distant, which on the previous March had stood twelve feet above the snow and now showed less than three feet, were the only remaining traces of our previous year's work and one and one-half tons of indispensable sledge supplies. One of the Eskimos deserted on the third march, and returned to the Lodge with his dogs and sledge.

Six marches more brought us to the vicinity of the big pemmican cache. The weather during this time was clear and very cold. A biting wind had nipped the toes, cheeks and noses of all of us, in Lee's case, as it afterward proved, quite severely. One entire day was spent by the whole party in an unsuccessful search for the cache. We were forced to the conclusion that the storm had broken the signal off.

On the following day three Eskimos, with a sledge and ten dogs, started back, while we continued to advance with three sledges and forty-one dogs, myself leading with eleven, Lee with fourteen, and Henson with sixteen. A combination of unfavorable circumstances made the following week an unpleasant contrast to the previous one. I was obliged now to drive a team of dogs. Having no trail to follow, it was more difficult to drive. A redistribution of the dogs, and the consequent inevitable fighting until every dog knew his place, reduced the effectiveness of their efforts, and worse than this, Lee's toe was giving him much trouble.

The fifth march brought us into a violent wind-storm, rushing down from the interior to Petermann Fjord. This delayed us two days, demoralizing our dogs, working havoc with the harness and traces, and leaving the sledges buried in overwhelming drifts. The close of the week found us only 200 miles from the moraine. We were 7,000 feet above the sea.

The following week was more satisfactory, placing something like a hundred miles to our credit. All this time the temperature ranged from —10° to —25° at noon, and —25° to —43° at midnight. We had met the midnight sun near the end of the second week, and now had continuous sunlight.

At the beginning of the fourth week it was evident that some change must be made. The dogs had become so fatigued I could no longer drive my team into the white, trackless, objectless desert ahead, and Mr. Lee's toe was giving him such trouble as to make it well-nigh impossible for him to handle a team.

By this time a number of the dogs had given out, and made it practicable to concentrate everything in two teams and send Lee ahead to set the course. This arrangement, with the daily icing of the sledges, enabled us to cover 122 miles in the week. It was a hard one. Some of the time we were almost 8,000 feet above the sea, and the average elevation for the week was 7,700 feet. The elevation had a marked effect on ourselves and the dogs, though we were able to walk at the moderate pace of two to two and one-half miles per hour without discomfort, and keep this up ten or twelve hours. A few sharp pulls on a sledge when the dogs balked or a few yards' run would take our wind completely, and the extra exertion would be followed by bleeding at the nose. The strength of men and dogs was reduced fully one-half, the raw, frozen meat ill-supplying the place of pemmican, even had we eaten a full ration of it, which we rarely did.

With our entrance upon the fifth hundred miles a series of mishaps occurred. Up to this time not a sledge had broken, but almost simultaneously with passing the four hundredth mile a runner of the largest sled went to pieces completely. A day was lost repairing the damage, and at the end of twelve miles the new runner broke beyond repair. Having no more material for repairing the second mishap, the sledge was converted into a three-runner, and we proceeded. At the end of the next march we fed the last of the walrus meat to the dogs. Only seventeen dogs now remained to us. After this the dogs went to pieces with startling rapidity, eleven being left at the end of the week, and these in such a condition that we were obliged to man the drag-ropes ourselves. We cached nearly everything and pushed on for the land. At the end of the next march the dogs were scarcely able to walk. We left them sixteen miles from the land and 5,000 feet above the sea in charge of Lee, with instructions to feed the weakest ones to the others until our return, and with Henson, two rifles, and four days' rations on a small sledge, I started down to the land in search of musk oxen.

After some trouble with crevasses we reached the land, but before we had finished our first rest the sky became overcast, and it commenced snowing. This weather continued while we remained on land, two days and nights, and we had to find our way back to the tent through snow and fog. During this trip we travelled until we were so fatigued, and our feet so sore, lame and bruised by sharp rocks, that we could scarcely walk. We slept on the rocks, without shelter, and returned to our tent exhausted with our efforts, and disappointed at finding no fresh trace of musk oxen.

The time of our absence had been scarcely less wearing to Lee than to ourselves. He was alone with a few starving dogs in that fierce frozen desert, uncertain of our return, helpless and doomed if aught happened to us.

Two alternatives now lay before us. We could start back at once, and the 200 pounds of walrus meat reserved for dog food for the return would probably keep the dogs alive two-thirds of the distance home. Then we could drag the loads the remaining distance ourselves. With fresh, well-fed dogs the walrus meat would have sufficed for the entire distance.

The other alternative was to give some of this meat to the dogs now, then go on with them in search of musk oxen as long as it lasted. If we found musk oxen, well and good; if not, then we must retrace those weary 500 miles, dragging our own supplies, with the certainty that one and the probability that all of us would never complete the journey. But there was a chance. We were Americans. One of us carried about him the Red, White and Blue. We could not turn back.

The decision was quickly made. Next day, dragging the sledge ourselves, we returned to the cache through the dense fog, gave the dogs an ample feed of walrus meat, and loaded everything upon the sledge except rations for the return trip, which were cached under a conspicuous tripod formed of a sledge and two ski.

The following day, with a little assistance from the dogs, we returned to the last camp. Next day we descended to the land, reaching it just in time to be storm-bound on the moraine for two days; then, with Henson and all the dogs, we went on across the land, leaving Mr. Lee again to a lonely vigil. The arduous land travel increased our appetites to a painful degree, and, having had no meat for the past three days, we were glad to make a lunch from raw frozen walrus meat intended for the dogs. Even of this we were obliged to eat sparingly, as the dogs needed it more than we.

Twelve hours of marching showed no recent traces of musk oxen, but I saw a hare, which Henson shot, and we immediately camped on a small lake, cooked, and ate it to the last morsel. It was the first square meal we had eaten since leaving Anniversary Lodge, and we appreciated it accordingly. Our spirits were materially raised by this good fortune, yet the entire absence of musk ox signs made me anxious. I began to fear that perhaps they only visited this region later in the season, or the killing of some of their number four years before had frightened the rest away permanently.

Next day, after several hours' travelling, I saw an indistinct trace of a single animal. Following it I observed the track of a calf, then other tracks, then the previous day's feeding ground of the herd. A few hours later we saw the herd itself, a group of dark spots on a terrace far up a mountain. Safe, thank God! and my poor dogs should feast till they could eat no more. Fastening the dogs and climbing cautiously the slope of the mountain, we approached within 200 yards. Beyond this there was no cover, and our eyes were so weak and unreliable with snow glare that we could not see to shoot at this distance. Lying behind a big boulder till we regained our breath, we then advanced on a run with loaded Winchesters. In a few minutes one bull, five cows and four calves were ours. The remainder of the herd disappeared in full gallop over the summit of the mountain. A two days unsuccessful pursuit of the herd followed, and then Henson went back to the moraine after the tent sledges and so on. During his absence of three days I searched unsuccessfully for musk oxen, living during that time entirely on musk ox meat *sans* biscuit, tea or salt. On the arrival of the boys we pushed forward toward Independence Bay over a most unpromising region, up and down steep slopes through boulder-strewn gorges, lifting, pushing, almost carrying sledge and load, double banking, sometimes travelling for hundreds of yards on sharp, snow-free rocks, and breaking the sledge every few hours. The almost complete absence of snow on the land was extremely annoying.

At the end of four days we reached the precipitous shore completely exhausted. The last pair of ski and the last wood had been used in repairing our sledge, which was already nearly worn out. Of oil we had something over a gallon, the tins having been broken and much of it lost by the capsizing of the sledge and contact with rocks. Nearly all our foot-gear was cut to pieces by the sharp stones.

The next stage of the journey was entirely impracticable for sledges, and everything must be backed down the steep shore bluffs, then over three or four miles of crevasse-riven glacier before reaching the bay ice. In our present condition we were not equal to the task. We must have rest before advancing further, and to insure rest we must have more musk oxen. We turned back to hunt for them, but a careful search failed to discover them or any fresh tracks. Our attack and scent and the sound of our pack of dogs had evidently driven them completely out of the region, and there was nothing left for us but retreat while yet our dogs were in fair condition. The snow on the land, scant when we arrived, had been rapidly disappearing since, and at least half of the return journey to the moraine was made over bare rocks. This soon destroyed the sledge completely, and the load was transported the remaining distance partly on our backs, partly rolled up in musk ox skins, and dragged by the dogs. This consumed six days.

At the moraine Henson constructed a small sledge from a pair of ski left there for that purpose, and by a forced march reached our cache, thirty-five miles inland, in spite of a snow-storm. I had now nine dogs and sixteen days' rations of musk ox meat for them.

For ourselves I had seventeen days' rations of raw venison. We were most fortunate in having favorable weather. Snow-shoes were used continuously, the sledge runners were iced twice a day, much of our venison was fed to the dogs, and every expedient known to the Eskimos was resorted to to facilitate our progress. In spite of two days' delay from illness and one from unfavorable weather, the Lodge was reached on June 25, in the twenty-five marches. One dog reached the Lodge with us. The last of our provisions were consumed at the beginning of the last march, twenty-one miles from the Lodge.

For some ten days after our return all of us were in a debilitated condition, troubled with swollen feet and legs, shortness of breath and constant diarrhœa.

From this we gradually recovered. The *Kite* arrived in Whale Sound on July 31, but the ice prevented her from entering Bowdoin Bay. Messrs. Diebitsch and Salisbury reached the Lodge overland from McCormick Bay [to the north of the camp] on Aug. 3. Lee, Henson and I returned with them on the following day, and the *Kite* immediately proceeded to Karnah, where I took on a crew of natives for walrus-hunting in Murchison Sound, then to Littleton Island and Cape Sabine [in Smith Sound, further north], thence back to Whale Sound. We were able to enter Falcon Harbor on Aug. 11. From here an attempt was made to reach the head of Inglefield Gulf for deer, but the ice prevented, and the *Kite* entered Olriks Bay. From here we recrossed the gulf to Karnah again, and thence to Wolstenholme Sound, where a number of large bull walrus were obtained. From Wolstenholme Sound we went south to Cape York, and the ice fortunately proving favorable, we advanced eastward into Melville Bay to the Loon Mountains, where the two meteorites, the "woman" and the "dog," which for ages furnished the ancestors of the Vhale Sound Eskimos with iron for their knives, were by Mr. Diebitsch's skill agged over one and one-half miles of rock, glacier, and floating ice, and safely mbarked. The larger weighs about three tons.

Returning to Camp York the *Kite*, on Sept. 1, steamed west for Jones's Sound, hich was penetrated to the edge of the heavy ice. Twenty-seven miles west of oburg Island numerous traces of Eskimo were found.

We next steamed down the west side and south of Lancaster Sound. We spoke the whaling fleet, visited an Eskimo village at Dexterity harbor, and steamed across for Godhavn, but were caught in the middle pack and held for two days. We reached Disco on Sept. 11, sailed on the 12th, touched Turnavik, Labrador, on the 18th, and arrived in St. John's on the 21st.

The season has not been a severe one in the Smith Sound region. If it had not been for the loss of my provisions I should have accomplished my purpose.

No man could have been more fortunate in having two such loyal, brave, and sturdy comrades as stood by me—Lee, as full of sand as one of his own Connecticut beaches, and Henson, unhesitating and as tenacious of his object as a bulldog. No man could be more unfortunate in being unable to reward their courage and efforts with a full measure of success.

The mapping of the Whale Sound region and the studies and ethnological collections of the Arctic highlanders have been completed. Another year's meteorological records have been obtained, and the *Kite* brings back two of the most interesting meteors in the world.

R. E. PEARY, C. E., U. S. N.

The *Kite* has on board the most valuable collection ever brought from the Arctic regions. It is mainly the work of Prof. Dyche, of Kansas University, who collected nearly 4,000 specimens of birds, eggs, and animals in the neighborhood of Holsteinborg, besides which there were also secured during the *Kite's* cruise, 24 walruses, 3 narwhal, 25 seals, 13 polar bears, and a number of other animals. Peary secured many valuable meteorological data. He thoroughly surveyed Inglefield Gulf and the neighborhood.

WASHINGTON LETTER.

WASHINGTON, SEPT. 28, 1895.

The printing and binding of the final volumes of the Census of 1890 has been stopped at the Government Printing Office on account of insufficient appropriations. This will occasion a further delay of fully six months in the completion of a work already five years out of date. Of the twenty-five volumes contemplated only nine have been distributed, while eight more have been completed but not distributed. The "copy" for three important volumes, viz.: Population, Part 2, Vital Statistics, Part 1, and Compendium, Part 3, is not yet completed.

By a happy accident some of the most experienced clerks in the Census service have been transferred to permanent positions in the Departments, so that their skill and experience can be brought into requisition in the future. It was not contemplated by the act abolishing the Census Office (which office had not been under Civil Service regulations) and providing for a Division only in the Department of the Interior, that any change in the status of the employees of the Census Office relative to the Civil Service should take place. But as the Census Office was abolished, and provision made for the establishment of a Census Division, the Civil Service Commission very properly decided that the new Division must be subject to all the rules and regulations governing other divisions of the Secretary's office. As the act abolishing the Census Office took effect on the 4th of March, 1895, and the Census Division was brought into service on that day, it was decided by the Civil Service Commission that the employees in the Census Division should be considered as within the classified service and subject to transfer the same as employees in offices over which the civil-service law has been extended by Executive order.

The Report of the National Museum for 1893, prepared under the direction of Dr. G. Brown Goode, and recently published, presents a programme of varied and interesting attractions.

We have (1) Dr. Goode's account of the organization, scope and development of the Museum; recent advances in museum methods; review of the work of the scientific departments of the Museum, including their participation in the World's Columbian Exposition.

(2) Papers by specialists describing and illustrating collections in the Museum.

The National Museum now contains over three million objects, one-fifth of which relate to ethnology and prehistoric anthropology.

Among acquisitions of wide celebrity are the Catlin Indian gallery, of inestimable value to the American historian, ethnologist and geographer; the Baird collection of North American vertebrates; the Isaac Lea collection of 20,000 conchological specimens, besides minerals and other objects; the Bendire and Ralph collections of American birds' eggs; the Lacoe collection of fossil plants; the collection of the American Institute of Mining Engineers; a valuable collection of ethnological objects collected in Tibet by W. W. Rockhill; the Japanese gold lacquers, bronzes, porcelains, carvings in ivory and wood, gathered by the late Gen. Horace Capron while U. S. Minister to Japan; the Riley collection of North American insects—about 150,000 specimens; the personal relics of Washington, Franklin, Jefferson and General Grant,—the latter deposited by the late W. H. Vanderbilt.

The late Prof. Baird was once asked whether the value of the collections in the Museum was equal to the amount expended in its maintenance. He replied unhesitatingly that he did not doubt that the entire sum could be recovered.

The ethnological collections are particularly complete for North America, and are becoming fairly representative of the whole world. Prof. Otis T. Mason has long been engaged in bringing these vast materials under control, so that any object with its full history can be consulted without delay, by means of a card catalogue.

The collection of prehistoric anthropology—one of the largest and most impressive in the Museum—is arranged in two series: (1), a synoptical series, with reference to prehistoric man; (2), a geographical series, in which the greater portion of the collection is arranged with reference to political subdivisions. An interesting collection has been received from Mrs. Schliemann, consisting of prehistoric antiquities gathered by her husband, lately deceased, during his excavations on the hill of Hissarlik on the site of ancient Troy.

The papers accompanying this report include:

Notes on the Ethnology of Tibet, by W. W. Rockhill.

Two Persepolitan casts in the U. S. National Museum, by Cyrus Adler.

Museum collections to illustrate religious history and ceremonials, by Cyrus Adler.

If Public Libraries, why not Public Museums?, by E. S. Morse.

Congress by a Joint Resolution in 1892 opened all the literary and scientific collections in Washington for the use of students, with the definitely avowed purpose of encouraging the establishment and endowment of institutions of learning at the National Capital. After a preamble, the resolution recites:

> That the facilities for research and illustration in the following and any other Governmental collections now existing or hereafter to be established in the City of Washington, for the promotion of knowledge, shall be accessible, under such rules and restrictions as the officers in charge of each collection may prescribe, subject to such authority as is now or may hereafter be permitted by law, to the scientific investigators and to students of any institution of higher education now incorporated or hereafter to be incorporated under the laws of Congress or of the District of Columbia, to wit: the
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> Library of Congress,
> National Museum,
> Patent Office,
> Bureau of Education,
> Bureau of Ethnology,
> Army Medical Museum,
> Department of Agriculture,
> Fish Commission,
> Botanic Gardens,
> Coast and Geodetic Survey,
> Geological Survey,
> Naval Observatory.
>
> NOTE: The Smithsonian Institution being a private endowment, is not subject to Congressional regulation.

The Report of the Commission to the Columbian Historical Exposition in Madrid has lately been printed. The Commission consisted originally of Rear-Admiral S. B. Luce, James C. Welling and Dr. G. Brown Goode.

The Spanish Government provided a series of international celebrations in commemoration of the fourth centenary of the Discovery of America. Most prominent among these were two historical expositions to be held in Madrid simultaneously and in adjacent buildings,—one the Exposicion Historico-Americana, and the other the Exposicion Historico-Europea. The Historic American Exposition was intended to illustrate the civilization of the new continent in the Pre-Columbian, Columbian and Post-Columbian periods. The Historic European Exposition was intended to illustrate the period during which American history was most closely identified with that of Europe, viz., from 1492 to 1620.

Dr. Walter Hough of the National Museum, who accompanied the Commissioners, says the display was the greatest collection of Americana ever under one roof. It was in many respects one of the most noteworthy international expositions ever held, although from its very nature it appealed more to the scholar than to the general public, and therefore, as far as popular attendance and financial outcome were concerned, was not noteworthy.

Besides the United States Government, all the Latin-American Republics were liberally represented. There were also collections from numerous private sources. The total number of objects presented reached nearly two hundred thousand.

Mr. William E. Curtis is authority for the statement that, although the Exposition was intended to be exclusively historical and to commemorate the discovery of America by Christopher Columbus by a nation whose greatest glory is in his achievements, both the man and the event were practically ignored by Spain, and all the other nations participating, with the exception of the United States. The building was crowded with a magnificent and remarkable display of articles illustrating the art, the industry, the piety, the martial conquests, and the luxury of the reign of Ferdinand and Isabella. The archives of the government, the museums and libraries, the cathedrals, churches and monasteries, the public and private palaces of the Peninsula were stripped of their treasures to form an exhibition that was never surpassed in the extent and value of its historical features; but the only articles contributed by Spain that related directly or indirectly to Columbus were the following:

1. An autograph letter from Juan Colona, the notarial secretary of Ferdinand and Isabella, to Friar Boil, the priest who accompanied Columbus on his second voyage.

2. A certified copy, made in 1545, of the will of Diego Colon, son of Columbus.

3. A copy of the letter written to the Catholic sovereigns by Columbus after his wreck in 1503.

4. The original memorial of Don Luis Colon, grandson of Columbus, demanding the rights to which he was entitled under the contract made by the sovereigns with his grandfather.

5. Several medals.

The seventy-seven portraits of Columbus contributed by Mr. Curtis included the originals or copies of all that had been painted or published of any historical interest or artistic value up to January, 1892, and proved to be one of the most valued features of the Exposition. None were authentic. It was distinctly stated in the catalogue that there was no evidence that the features of Columbus were ever painted or engraved by any one during his life, and that the date of the earliest picture that pretended to represent him was six years later than his death.

When the Division of Ornithology and Mammalogy of the Department of Agriculture several years ago instituted a study of the geographic distribution of life in North America, the transcontinental or zonary character of the principal life areas was not recognized, and the laws governing distribution were unknown. Zoölogists and botanists had always worked independently. The maps each had published differed radically, and no agreement could be found between the two series. *

The first biological survey by Dr. Merriam, in 1889, established the important facts that the same laws govern the distribution of both animals and plants, and that the resulting areas of distribution are essentially coincident. It showed also that the life areas of North America and the Northern Hemisphere as a whole take the form of a definite number of circumpolar or transcontinental belts, and that these belts or zones naturally arrange themselves in two principal categories or regions—a northern or Boreal, and a southern, or Austral.

In this year Congress was urged to enlarge the scope of this work, so that the Division might carry on a systematic survey. The request was acceded to, and the task of mapping the distribution of species and ascertaining the boundaries of the natural life zones was given greater prominence, and has since been pushed as rapidly as the means at hand permitted.

In 1890 a biological reconnoissance was made of south-central Idaho. In the report of this expedition † the courses of the several zones were described, and the characteristic species of animals and plants enumerated.

In 1891 the most comprehensive and thorough biological survey ever undertaken was made by the Division. The expedition, which came to be known as the Death Valley Expedition, had for its field of operation an area embracing 100,000 square miles, stretching from the Pacific coast to the 113th meridian, and from latitude 34° to 38°. This area, embracing the highest and lowest lands within the United States—from Death Valley, nearly 500 feet below the level of the sea, to the peaks of the high Sierra—was selected because of the exceptional advantages it offered for studying the distribution of animals and plants in relation to the effects of temperature and humidity at different altitudes.

This expedition determined the distinctive species of each zone, traced the courses of the several zones from California to the Colorado plateau, and made large collections of specimens. The results

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* Dr. C. Hart Merriam, on the geographic distribution of animals and plants in North America; in Year Book of the Dep't of Agriculture, 1894.

† North American Fauna, No. 5.

fill three volumes, two of which have been published;* the third has not yet gone to press.

In 1892 the northern boundary of the Lower Sonoran zone was traced from New Mexico eastward across Texas, Indian Territory, and Arkansas, to the Mississippi; and in the same year Dr. Merriam published an essay on "The geographic distribution of life in North America with special reference to the mammalia." Tables of distinctive species were published, and the actual tortuous courses of zones were shown on a colored map.

In 1893 a biological reconnoissance was made of Wyoming, a large part of which was found to be from 1,000 to 3,000 feet lower than represented on current maps, and consequently to have a warmer climate than was supposed. Other work was done on the Great Plains in Kansas, Nebraska, and the Dakotas, and also in Utah and on the table-land of Mexico.

In 1894 a biological reconnoissance was made of the larger part of Montana. Other work was done in South Dakota and Arizona.

The work accomplished by the Division, Dr. Merriam says, may be summarized as follows: "The continent of North America has been divided into three primary life regions—Boreal, Austral, and Tropical—each of transcontinental extent. Their boundaries are sinuous, conforming to the distribution of temperature. The *Boreal* region stretches from Nova Scotia and Newfoundland westward to the Pacific, and from northern New England and the Great Lakes northward to the pole and southward over the principal mountains of the United States and Mexico. It is subdivided into three principal belts or zones—Arctic, Hudsonian, and Canadian. The *Austral* region is likewise subdivided into three zones—Transition, Upper Austral, and Lower Austral. The *Tropical* region comprises Central America, the greater part of the coastal lowlands of Mexico, and the Antilles. There are three points of it in the United States—southern Florida, the lower Rio Grande region in Texas and the valley of the lower Colorado River."

Dr. Merriam believes that the principles controlling the geographic distribution of terrestrial animals and plants have been discovered, and that they may be expressed as follows:

"In *northward* distribution terrestrial animals and plants are restricted by the sum of the positive temperatures for the entire season of growth and reproduction."

"In the *southward* distribution they are restricted by the mean temperature of a brief period during the hottest part of the year. It is believed that these two principles cover the fundamental facts of distribution."

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* *North American Fauna*, No. 7, 1893; and *Contributions from the U. S. National Herbarium*, Vol. 4, 1893.

Mr. W. C. Hodgkins, who represented the Coast Survey in the adjustment of the boundary line between Pennsylvania and Delaware, has written an historical account of that long-pending controversy. It accompanies the detailed account of technical operations in connection with the recent resurvey of the line.*

This boundary controversy extends over more than two centuries. It originated in a compact between Penn and Lord Baltimore in 1681, whereby it was agreed that the southern boundary of Pennsylvania should follow a circular curve at twelve miles distance from Newcastle, northward and westward from the Delaware River until it came to the 40th parallel; and that it should then follow that parallel westward to its limit of longitude. As a matter of fact, the most northern part of a circle of twelve miles radius from Newcastle court-house is almost exactly on the parallel of 39° 50′ north latitude, and it could therefore never intersect the parallel of 40°.

The Penn charter contains the first mention of this singular boundary line, almost unique in its circular shape.

After granting the charter the King commanded Penn and Lord Baltimore to "arrange" their boundary. Accordingly, Lord Baltimore met Penn's deputy at Upland, when it was found that the 40th parallel was several miles north of Upland instead of being somewhat to the south of it, as formerly supposed. Lord Baltimore at once claimed the land to his charter limit of 40 degrees, wherever it might lie. Markham, the deputy, declined to proceed with the delimitation of the provinces and reported to Penn.

With varying efforts for settlement the disagreements continued year after year. Penn died in 1718, leaving the dispute to his heirs.

The matter dragged along until 1732, when the heirs of Penn and the Lord Baltimore of that day joined in a deed to settle their boundaries. An apparent agreement was reached, when difficulties and disputes arose as to carrying out upon the ground the provisions of the deed. For instance, the question as to the proper point in Newcastle which should be taken for the centre of the 12-mile circle occasioned long debate. Lord Baltimore's friends insisted on the absurd theory that the "12 miles" meant the periphery of the circle, while the Penns, of course, claimed that length of radius. A dispute also arose as to the true location of Cape Henlopen. In consequence of these and other difficulties nothing was done to carry out the deed.

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* Appendix No. 8, Coast Survey Report, 1893.

In 1760 another deed was executed by the interested parties, in which the designated boundary was substantially the same as that of 1732. Commissioners were appointed on each side to supervise the work of demarcation. After three years of labor, and no solution reached, Messrs. Mason and Dixon, surveyors, were engaged to assist the commissioners, and they did so assist for the next four years.

While not without errors, as pointed out by Col. J. D. Graham 80 years later, the lines of Mason and Dixon were marked with suitable and enduring monuments.

When the proprietary governments were swept away by the Revolution, and the connection between Pennsylvania and the "three lower counties" became broken, the disaffected portion became the State of Delaware. The boundary between Pennsylvania and the new State of Delaware reverted to the old circular line.

In 1849 and 1850, Col. J. D. Graham of the U. S. Topographical Engineers superintended a revision of a portion of Mason and Dixon's work.

This re-survey was due to the following circumstances: The monument which had been placed in 1768 at the northeastern corner of Maryland disappeared from its place. The absence of this stone and the uncertainty as to the significance of others in the neighborhood combined with rumors of the unauthorized moving of some of the monuments produced a general feeling of doubt in regard to the northeastern boundary of Maryland, and led to the appointment of a joint commission composed of one representative from each of the three States—Pennsylvania, Maryland and Delaware.

The details of Col. Graham's operations are quite fully described in his report subsequently published by each of the three States.

Notwithstanding the fact that apparently erroneous conclusions as to the true point of junction of the three States, and as to the proper location of the circular boundary were embodied in a map which received the signatures of the three commissioners, the results were generally accepted on paper, while ignored in fact. No subsequent act of ratification seems to have been passed by the State Legislatures.

The increasing importance of the boundary as the country grew in population and wealth led to a renewed agitation of the question forty years later. In 1889 the Legislatures of Delaware and Pennsylvania passed acts authorizing commissioners to examine, survey and re-establish the boundary line between the two States. A few years later (1892) the joint commission applied to the Superintendent of the Coast Survey for assistance in the matter and the detail of an officer to execute the field work.

The new line, now marked by 46 substantial monuments, it appears reasonable to suppose, will remain the boundary.

A Geological reconnoissance across Idaho, by George H. Eldridge. This is an advance extract from the Sixteenth Annual Report of the U. S. Geological Survey. It is accompanied by a general map of Idaho and by five sketch maps of mining districts. The general map was compiled from the atlas sheets of the Survey, the maps of the General Land Office, and a rough sketch map of Lemhi County prepared by Mr. Birdsye, of Salmon City. The reconnoissance was on a northeast line through Boise and Salmon City, and was authorized as a preliminary to the future geological study of the State.

Idaho is full of great topographic features. The Snake Plains cut by the river to the depth of 400 to 1,000 feet constitute one of the prominent features of the State, and indeed of the West. They extend completely across the southern end of Idaho, and are elevated from two to five thousand feet.

The portion of Idaho lying north of the Snake Plains is an intricate region of lofty mountains and deep canyons. The altitude of the mountains varies between 6,000 and 12,000 feet, while 3,000 to 4,000 feet is a common depth for the canyons, many of which are quite impassable.

The Snake River, whose waters are derived in part from the Continental Divide in the vicinity of the Yellowstone Park, constitutes with its tributaries the drainage channel of nearly the whole of Idaho. It forms a third of the western boundary of the State.

Evidences of early glaciers are observed at many points along the route of this reconnoissance, and it is probable that their existence was quite general throughout the mountain region of Idaho. Indeed—Mr. Eldridge says—nearly all the valleys traversed show at their heads more or less evidence of former glaciers.

As implied in the title, the work is chiefly descriptive of the geologic formations and mining districts of Idaho. In a concluding paragraph, however, the writer says as to agricultural possibilities, that but little area is available for farming in comparison with that of many other Western States. The valleys are few, but very fertile. Fruits in one locality or another attain remarkable perfection, but the area for large farming operations is at present small.

In the Proceedings of the Geodetic Conference of 1894, lately published by the Coast Survey,* Mr. J. E. McGrath gives an account of the recent extraordinary growth of the but partially explored country of Alaska, the extent and wealth of the forests, fisheries, mines, furs, etc.

Mr. McGrath was engaged for two years and over on the survey of the yet undetermined boundary line between Alaska and British Columbia.

The committee on Alaska of the Goedetic Conference recommends a topographical reconnoissance of the great inland water passages of southeastern Alaska, in order to supply needed topographic features of the hydrographic survey now quite completed. The committee also asserts that the demands of the whaling and fishing fleets, and of naval, shipping and trading vessels, require that the passes through the fog-covered line of islands of the Aleutian group, now imperfectly laid down on existing maps, should be better determined. That the great industries centred about Kadiak and the western end of the Aleutian peninsula make a survey of this section only second in importance to the one just mentioned. That a survey should be made of the mouth of the Yukon—the Mississippi River of this vast territory—now practically useless on account of almost complete ignorance of the channels and waterways through its delta. This would open up a ready means of entrance into the heart of Alaska. The river gets into St. Michael's Harbor by passing over, literally overflowing the continuous sandbars that seek to shut up the river, the overflow skirting the western Alaskan coast for about eighty miles. No direct practicable channel to the ocean has been discovered. For some six or eight hundred miles up, the river averages from one to ten miles in width, and is very deep. It would be navigable for ocean steamers if there were any way of getting over the sand-bars at the mouth. The next eight hundred miles average about one and a half miles in width.

It has been asserted that during the period from the time of the purchase of Alaska, in 1867, to 1890, an estimate of the value of products shipped hence is about ten and a half times the price paid for it. The Census of 1890 and the annual reports of the Governor are the latest and only official sources of information for Alaskan statistics.

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* Appendix No. 9, Report for 1893.

Summarizing the Alaskan work of the Coast Survey it may be said that in the year of purchase—1867—Mr. Seward arranged for a geographical reconnoissance, from which the first Coast Pilot of southeastern Alaska was compiled. This work included only the more important points from Dixon Entrance to Unalaska. In 1871, '72, '73 and '74 nothing of importance was accomplished; but in 1882 a trigonometric and hydrographic reconnoissance of the inland waters of southeastern Alaska was commenced which, with the exception of one year, has been continued to the present time.

In 1892 the longitude of Sitka was determined, and during that and succeeding years four other points for the international boundary work. The Coast Survey charts of Alaskan waters now number forty-two.

When it was found to be impossible at the last session of Congress to pass through the House the bill which had already passed the Senate to aid in the construction of the Nicaragua Canal, an amendment was attached to the Sundry Civil Expenses bill, appropriating $20,000, and constituting a board of engineers to make a survey and examination for the purpose of ascertaining the feasibility, permanence, and cost of the construction and completion of the canal by the route contemplated in the Senate bill. The Board, appointed by the President of the United States, consisted of Maj. William Ludlow, Corps of Engineers, U. S. A., Commander M. T. Endicott, U. S. N., and Alfred Noble, civilian.

It was directed to visit and personally inspect the route, examine and consider the plans, profiles, sections, prisms, and specifications for its various parts, and report to the President; and should it ascertain that any deviation from the general line of the proposed route is desirable it should so state in the findings and conclusions. The Board was required to make its report before November 1st, 1895.

The report of the Board will not be made public until it is sent to Congress. It is stated, however, that the conclusions are favorable to the present general plan of the canal with some deviation of details and increased estimates as to cost.

Under enactments made by the Legislature of Massachusetts in 1893 and 1894, that State has a highway commission composed of three competent persons, who have power to decide what roads in the Commonwealth on the application of county commissioners, or mayor and aldermen of cities or selectmen of a town, shall be laid out, constructed and kept in repair at the expense of the State, and known as State roads. The sum of $300,000 was appropriated in 1894 to make the act effective.

This enactment grew out of popular agitation, and demands for good roads, and was based on the investigations of a prior commission appointed to inquire into the entire subject.

A curious incident in connection with the outset of the work of this commission was the fact that in this late year of grace it could obtain but little data (so it is said) from any published reports as to methods and cost of construction and maintenance of roads. So, it set about acquiring the information through public hearings, communications with town officials and personal investigation. As a result, the demands of the people and the purposes of the Legislature are now being carried out under the scientific supervision of a permanent Board. All work is done according to specifications and plans furnished by the commission, the engineer in chief having charge.

The Assembly of the State of New York at its last session passed an act to provide for the construction of roads by local assessment, County, and State aid. It was not reached in the Senate, and did not become a law. The proposed act was based upon the effective State-aid law of New Jersey, modified and improved in some details, and is probably the best development of the State-aid plan of road construction. The bill provided that one-third of the total cost of construction or improvement must be paid by the owners of the land and property benefited; one-third by the County, and the remaining one-third by the State. When completed, such roads become County roads, and are then maintained at County expense.

In New Jersey, the State pays one-third the cost of construction of new highways, the adjoining property-owners ten per cent., and the County the balance, and maintains the road. Two of the leading roads are extended half way across the State, and, as it so happens, they are leading directly towards two very popular sea-side resorts. New Jersey was the first State in the Union that ever paid money under a law granting State aid for the construction of public roads. The provisions of the law, and the manner in which it has been enforced have proved satisfactory to the people of the localities where the improvements are located and to others who have witnessed the practical benefits arising therefrom. The rapidity with which this sentiment has increased is apparent in the demands from more than half the counties of the State, from which applications now on file represent enough miles of road seeking recognition under the law to absorb the present annual State allowance for two years in advance.*

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* Edward Burrough of N. J., in Bulletin No. 9, Office of Road Inquiry, Dept. of Agriculture.

The want of material available for good road-making is not infrequently a serious obstacle in some localities. Much valuable information on this point has been supplied by officials of various railway companies in certain States north of the Ohio River, in reply to a circular of inquiry sent out by the U. S. Office of Road Inquiry, asking railroad managers for information in regard to the supply of good road materials, accessibility, reduced rates of transportation, etc., along their respective lines.*

In a little treatise entitled "Phototopography as practiced in Italy and in the Dominion of Canada," Mr. J. A. Flemer, of the Coast Survey, gives a short review of the more important photographic surveys, and of some of the publications on photogrammetry and phototopography, as well as a concise description of the general methods and principles of phototopography as practiced in Europe and in the Dominion of Canada, in order, he says, that this branch of surveying may become more generally known, tested, and amplified in this country.

The term phototopography should be generally adopted for all topographic surveys based on perspective views of the terrene obtained by means of the camera.

Concerning the topographic survey of the United States, Mr. Flemer says the land is so diversified and the population so unevenly distributed that the methods to be employed should also be diversified; the character and value of the different sections should govern the accuracy and amounts of detail of the survey in order to reach the quickest practically useful and valuable results. Minute and detailed methods, with ensuing accurate results, should be applied to cities and all closely settled regions, to the coast, larger rivers, and lakes, and the work should be platted on a large scale. Arid, barren, and mountainous regions, as well as prairies and swamp lands, should be more generalized in their cartographic representations, and platted on a small scale. He cites the new survey of Italy in demonstration, where phototopography has reached a high state of perfection under the auspices of the Military Geographical Institute. At present, he says, phototopography cannot replace instrumental topography; still, experience in Italy, France, Canada, Austria and Germany has proved it to be a very valuable adjunct to the plane table and transit for topographic surveys of rugged mountainous regions, if they are not too much wooded. H.

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* Bulletin No. 6; Office of Road Inquiry.

BOOK NOTICES.

De Saint-Louis à Tripoli par le Lac Tchad. Voyage au travers du Soudan et du Sahara, accompli pendant les Années 1890–91–92 par le Lieut.-Colonel P.-L. Monteil, de l'Infanterie de Marine. Préface de M. le Vte. Melchior de Vogüé de l'Académie Française. Illustrations de Riou, d'après le texte et les documents du lieutenant-colonel Monteil et les photographies du Commandant Quiquandon. 4to. Paris, Felix Alcan, Éditeur (1895).

In his charming preface, M. de Vogüé classes Monteil with the greatest peaceful explorers, such as Barth, Nachtigal and Livingstone. This does not mean that Monteil is a member of the Peace Society. On the contrary, he acted throughout his long journey upon the principle that if you wish for peace you must be ready for war. He was often in difficult, and frequently in perilous, positions, but his coolness, vigilance and prudence carried him safely through all without a fight. It is essential to know the character and temper of the wild men; for, as Col. Monteil says, there are moments in the Negro country when a man must not hesitate to risk his life rather than give up a needle.

The line of march led from St. Louis, in Senegal, in a general easterly direction for about 2,200 miles to Kuka, on the western shore of Lake Tchad, and thence almost directly north across the Sahara to Tripoli, a distance of 1,300 miles.

After leaving the French Sudan, M. Monteil entered the Mossi kingdom, which covers about 40,000 square miles in the bend of the Niger. This country is ruled by a number of chiefs called Nabas, who derive their authority from the original Naba, a king who reigned at the beginning of the world, and bequeathed his empire to his 333 sons. Family affection, or the power of the number three, has kept Mossi in peace and prosperity. The villages are quiet, the lands well cultivated, and the people come and go, often unarmed, along the roads; while here only, in the Sudan, are the villages undefended by fortifications. The principal products are millet, beans, cotton and indigo, and the country is famous for its horses and asses. The inhabitants manufacture cotton cloth, silk embroideries and leather, and work in various metals.

Beyond Mossi is Sokoto, the empire which divides with Bornu the Central Sudan. The ruling race is the Peul, or Poul, or Fellata, of which M. Monteil gives this description:

> Physically, the Peul does not resemble the negro; his complexion is a brown red, his figure slender and flexible, with fine well-shaped extremities; the face is that of the Caucasian, the nose nearly always aquiline, and the forehead high and broad; the hair very fine and without the woolly appearance.

Intellectually, the Peuls are quick and keen. They have courteous manners and are very hospitable, sober and temperate, and pure in their family life. Their organization is tribal, and they spare no pains to extend their influence in the Sudan.

At Kano, the commercial centre of the Sudan, the expedition was detained nearly four months by the intrigues of the king's courtiers. Kano is a town of about five miles in diameter and is surrounded by a stockade, 25 feet in height. Its permanent population is estimated at 60,000, and the number of those who visit the city on business during the year can hardly fall below 2,000,000.

All the pilgrims to Mecca from the Central and Western Sudan pass through Kano, and 30,000 persons, at least, frequent the market every day. The transactions are by direct exchange of articles and by payment in cowries (1000=1 franc); rarely in money. The town furnishes the Sudan and the Sahara, for the most part, with clothing and with dyed stuffs, and the yellow and red morocco skins in the markets of Tripoli, Tunisia, Algeria and Morocco, are prepared at Kano.

Besides the slaves, or captives, as M. Monteil prefers to call them, and the salt from Timbuktu, Kano imports vast quantities of kola nuts, and distributes them as far to the eastward as Khartum. The nut loses its value if exposed to the air. It must be carefully packed with wet leaves and damp cloths, and when the caravan is on the road the packages must be inspected and the wrappings renewed every few days. M. Monteil is skeptical as to the virtues of the kola. The effect of two of the nuts upon himself was to cause a feverish uneasiness, and he made no second experiment.

Leaving Kano about the middle of February, M. Monteil entered Kuka, the capital of Bornu, on the 10th of April. He spent four months in this place, well treated as to forms and courtesies, but in danger of being reduced to poverty by the incessant demands upon his purse in return for the presents—a calabash of grain or a chicken—forced upon him many times in the day. The slave brought the gift, set it down, and waited for the acknowledgment.

If this did not greatly exceed the value of the gift, the slave departed with a gesture of contempt for the European.

According to M. Monteil, the long detention of Barth and Nachtigal in Bornu was due to the successful working of this ingenious system of robbery under the form of hospitality.

As soon as his own eyes were opened, he took radical measures. When a gift came, he returned a strict equivalent, and took it back at the first sign of discontent. In this way he husbanded his resources to the end of his stay.

At Kuka he met Valpreda, Nachtigal's servant, who had played a treacherous part to his master and had become a Mohammedan. Now, after more than twenty years, this unhappy man longed for his native land, but he was kept in a state of dependence, and was closely watched when a caravan left the town.

The route from Bornu to Murzuk is one of the worst in the Sahara. Forage is scanty, and the caravans are exposed to the attacks of the Tuaregs and the Ulad-Sliman. There are few landmarks, but the line of march is directly to the north, and the leader steers by the pole-star.

It was on the 25th of October that Col. Monteil entered Murzuk, where he was lodged in the house once occupied by Miss Tinne. It was there that he heard the story of the fate which had overtaken her murderer.*

The long march ended at Tripoli, and on the 18th of December the whole party landed at Marseilles. Not long after, Col. Monteil returned to Africa, and it was during his absence that the present magnificent volume was published. This contains, besides 65 excellent illustrations, 16 maps of routes and one general map, and, in an appendix, the determinations of latitude and longitude of 118 positions.

A Chapter in the History of Cleveland, by C. M. Burton. 8vo. Detroit, The Wilton-Smith Co., 1895.

In this paper, which is addressed to the Western Reserve Historical Society, Mr. Burton gives the substance of a number of letters and documents, relating to the affairs of Northern Ohio and the neighboring States and Upper Canada for the period 1760–1818.

These documents were acquired by purchase in Canada in the year 1894. Among them are letters signed by Arthur St. Clair,

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*Journal, American Geographical Society, Vol. XXVI, 1894, pp. 88–89.

Joseph Brant, the Moravians Zeisberger and Heckewelder, Wm. Henry Harrison, Arent Schuyler de Peyster, and many more, and Mr. Burton prints, in the Appendix, a deed of lands on the southerly shore of Lake Erie, conveyed to John Askin and others by the Chiefs of the Ottawa, Chippewa and Messasague Indians, for the term of nine hundred and ninety-nine years, in Consideration of the sum of Five Shillings, Halifax Currency, in hand paid, and the yearly rent of Five Shillings of the same currency, at the expiration of every year. The tract of land ceded for this price was about 60 miles in length by 80 miles in breadth, and the canny white men took the precaution of closing the instrument with the declaration that the Indians were perfectly sober at the time of delivering their act and deed.

Das Deutsch-Afrikanische Schutzgebiet. Im amtlichen Auftrage von Dr. Karl Peters. Mit 23 Vollbildern und 21 Textabbildungen, sowie 3 Karten in besonderer Mappe. 8vo. *Munchen und Leipzig, Druck und Verlag von R. Oldenbourg, 1895.*

In the introductory chapter, Dr. Peters states the various reasons which urge upon Germany the establishment of a colonial empire. These reasons are familiar enough, and there is something almost comical in the dismay with which he regards the spread of the English language. He notes that in the middle of the 18th century there were 9,000,000 of English-speaking persons in the world against 20,000,000 who spoke German, while to-day the numbers are 110–120,000,000 English against 60 or 70,000,000 Germans. He quotes Sir Charles Dilke's triumphant exclamation that the world is rapidly becoming English, and lays the responsibility for this disastrous change upon the German immigration into the English-speaking countries. Even if Sir Charles were right, there would still be cakes and ale and Germans, more or less numerous, might live their lives and speak their speech; but Sir Charles is not right. He and Dr. Peters see an imaginary world. The real world contains 1,300,000,000 of persons who speak neither English nor German, and very many of them propose to manage their own affairs.

It is a fact that the German emigration has been lost to Germany, and also that much the larger part of it has found its way to the United States. The record, as printed in the *Almanach de Gotha* for 1895, shows that the combined immigration into the United States from Germany and Austria, for the 72 years, 1821–1893, amounted to 5,715,110. This respectable number does not go far towards accounting for Dr. Peters's 50,000,000 missing Germans. Even if these were accounted for, they would only put the two races on an equality, and Dr. Peters implies that the Germans ought to have maintained their superiority.

The description of German East Africa, its resources and prospects, is written with knowledge and sobriety and good sense. The German possessions are neither the best nor the worst on the coast. There are tracts which offer the requisite conditions for successful culture: good soil, heat and a supply of water. If the country is neither a Ceylon nor an India, its most sterile districts nowhere sink to the level of the real desert. With roads and railroads and steady, well-directed industry applied to the soil, the future prosperity of this broad region, nearly twice the size of the Empire, is assured. About a fourth part of the area is at an elevation of 4,000 feet above the sea, and may be regarded as suitable for European settlement ; but the Europeans seem to be more interested in dividing than in settling Africa.

Dr. Peters's book is full of information, some of it of a superfluous kind. The *giant mountain*, Kilimanjaro, fascinates him, and, on p. 114, he takes the trouble to go through a calculation of its mass. This amounts, according to him, to 6,414 cubic kilometres, the weight of which is 12,828,000,000,000,000 kilogrammes, or 12,828 milliards of tons. It may be doubted whether any mountain was ever so handled before; but how does Dr. Peters know that Kilimanjaro is solid and not a bubble, or hollow mockery, on the face of the earth?

Numerous and excellent illustrations and three folding maps add to the value of this work.

Sopra Tre Speciali Projezioni Meridiane e i Mappamondi Ovali del Secolo XVI. M. Fiorini. 8vo. (reprint.) *Roma, Società Geografica Italiana. 1895.*

In this pamphlet Prof. Fiorini continues his instructive studies in cartography. The three special projections indicated in the title are: that proposed by the Arab geographer Albiruni in the year 1000, and adopted by Nicolosi, Delisle and Arrowsmith; that of Roger Bacon, which was sometimes employed in the sixteenth century; and that to which Prof. Fiorini gives the name of *equidistant meridian projection.* This last was in favour during part of the sixteenth century, and later examples of it are found in the Mercator Atlas of 1623 and in Fournier's *Hydrographie*, of 1667.

The oval projection, of which the *Typus Orbis Terrarum* in the

Ortelius of 1570 is a remarkable specimen, was in vogue for two centuries; its latest appearance, so far as known to Prof. Fiorini, being in Lotter's *Mappemonde* of 1783, in which the equatorial and polar diameters are, respectively, of 92 and 46 centimetres.

Cabinets and tables of ebony and other costly materials, adorned with the map of the world on the oval projection, inlaid in ivory, are preserved in the Trivulzi collection at Milan, in that of Count Emanuel·Bertone and in the museum of the Chartreuse of San Martino at Naples.

Geogenetische Beiträge von Dr. Otto Kuntze, Membre de l'Académie Internationale de Géographie Botanique, Ordentlichem, Ausländischem und Ehren-Mitgliede mehrerer gelehrter Gesellschaften. Mit 7 Textbildern und 2 Profilen. 8vo. Leipzig, Gressner & Schramm, 1895.

The subjects of these Contributions are: Oscillation of Level in the Andes without a Catastrophe; Denudation of Deserts, at present and in the Carboniferous Age; Origin of the Chilian Saltpetre; Silicification and Petrifaction of Woods; Continental Salt-formation; and the Origin of Coal, whether from vegetation *in situ* (autochthon), from transported vegetation (allochthon), or from the sea (pelagochthon).

Dr. Kuntze finds his evidence for the quiet changes of level in the Andes in the beds of iron-stained sands and laterite and in the similar flora of widely-separated regions, such as southern Chile and south-western Patagonia, on the one hand, and the coast mountain ranges of southern Brazil, on the other.

The supposed evidences of glacial action in the pampas are referred to the wind and the changes of temperature.

The deposits of saltpetre are attributed by Dr. Kuntze and by other authorities to the llamas and the guanacos.

The paper on Petrifaction of Woods is a sharp reply to a criticism of the author's views by Dr. A. Rothpletz.

The salt-deposits in regions remote from the sea are held to be the result of the decomposition of minerals containing chlorine.

Dr. Kuntze comes to the conclusion, after a long and learned argument, that the coal-formations are of marine origin,* and he meets the objection based on the rootlets of the plant *Stigmaria* by affirming that the supposed rootlets are floating leaves. A systematic botanist himself, he recognises the fact that every naturalist, at the present day, must be a specialist and, as such, must be content to fall behind in matters not of his province. This consideration, he says, does not hinder some specialists from looking down in a lofty fashion on their fellow-workers in other fields, nor yet from expressing decided opinions on subjects which they have not mastered. Many are clouded by their own conceit, but if Dr. Kuntze speaks with authority on questions of geological knowledge, it is to be remembered that geology was his first love.

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*...ist die pelagochthone Entstehung Carbonischer Kohlenfelder die einzige richtige Erklärung;...(p. 77).

Geographische Zeitschrift, Herausgegeben von Dr. Alfred Hettner, a. o. Professor an der Universität, Leipzig. Erster Jahrgang, Hefte 1, 2, 3 u. 4. 8vo. Leipzig, Druck und Verlag von B. G. Teubner, 1895.

In the introduction to the first number of this new periodical, Dr. Hettner makes four groups of the subjects to be treated, viz.:

1. Researches into problems in all branches of geography and the related sciences;
2. Characteristics of individual regions, as well as descriptions of countries and peoples and studies of the aspects of nature;
3. Surveys and discussions of the changes in geographical conditions, such as the alterations in political geography, the movements of population, the developments of commercial intercourse, etc.;
4. The more important questions concerning methods of geographical inquiry and instruction.

The list of contributors contains many well-known names, and among the articles already published are the following: The Treaty of Shimonoseki in its Geographical Relations, by Baron von Richthofen; The Influence of Climatic Variations upon Crops and the Prices of Corn in Europe, by Prof. E. Brückner; The Baltic and North Sea Canal, by Privy-Councillor Launhardt; The Yellowstone National Park, by Privy-Councillor Credner; The Causes of Steppe Formation in Europe, by Prof. Nehring; Recent Investigations and Views on the Structure of the Earth-Crust, by Dr. Alfred Philippson.

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JULY–SEPTEMBER, 1895.

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THE DEVELOPMENT OF THE GEOLOGIC ATLAS OF THE UNITED STATES.

BY

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Writing of the early work of the United States Geological Survey, the present Director recently stated: "Under the directorship of Mr. Clarence King prominence was given to investigations of the mineral resources of the Rocky Mountain region in Colorado, Utah, and Nevada . . . . With the change of directorship in 1881 and the granting of authority in 1882 to complete a geological map of the United States, the policy of the Survey was modified, and its work was directed under a very comprehensive plan to the preparation of the required geological map."

At that time there was probably but one man who grasped the full meaning of the phrase "a geological map of the United States," and even under his direction it required years of experiment and study to establish the methods of topographic, geologic, and cartographic work which have produced the first folios of the Geologic Atlas of the United States. It is the purpose of this article briefly to trace the development of those methods, to state their present operation, and to describe the Atlas which has grown from the authority "to complete a geological map" as the oak grows from the acorn.

The topographic base.—European geologists have, as a rule, found military maps of large scale and detailed execution ready for their use. American geologists have, as a rule, been forced to prepare such base-maps as they could. Pennsylvania, for instance, has seen the completion of its Second Geological Survey, although there is even yet no topographic map of the State. But the policy of the United States Geological Survey since 1881 has been to insist that the topographic is the indispensable base-map, and accordingly topographic surveys have been pushed energetically for fourteen years.

On account of the immense area thus to be surveyed, requiring on the scale of 2 miles to 1 inch about 3,500 atlas sheets of the adopted size, the methods of survey at first selected and later elaborated aimed primarily at economy with accuracy. It has required experience to prove the necessity of characteristic detail as well. The control of the topographic maps was from the beginning accurate, but the sketching which represents the environment of the mathematical points constituting the control was for a number of years broadly generalized. It has now come to be recognized that an *adequate* topographic map is something more than a map based on accurate control; it is one which faithfully describes the character of every feature delineated, be it stream, hill or road; it is one which is so characteristically true to the facts of drainage, relief and culture, that every cartographic detail can be identified with a natural feature, and every natural feature of sufficient magnitude to show on a map of that scale can be recognized. Such a map affords in every square inch numerous points for identification of positions. It is indispensable to the geologist, unless he himself shall turn topographer, but it demands for its execution the highest skill of the topographic artist. It is small cause for wonder, then, that the efforts of the topographers were at first unequal to the task, but it is cause for congratulation that there is now a body of trained men capable of doing the highest class of topographic work.

The classification of rocks.—A geologic map is one which shows the distribution of rocks of different kinds. In the map of the United States many thousand bodies of rocks must be delineated, and a primary problem in planning the Atlas related to the classification of rocks in a manner so simple that it could be easily comprehended and yet so elastic that it should include every possible variety.

Rocks are distinguished by genesis, by age, and by mineral or lithologic character. Accordingly, the classification adopted for the Atlas is primarily genetic; it recognizes igneous rocks, sedimentary rocks, and surficial rocks, the last consisting of the unconsolidated materials widely distributed over the surface of the land by water, ice and wind. Metamorphic rocks are classed as altered igneous or altered sedimentary rocks if their origin be known; otherwise they are classed with the most ancient rocks as of unknown origin.

Within each genetic class rocks are grouped by age. Geologic time is somewhat arbitrarily divided into ten great periods, corresponding as nearly as may be to divisions generally recognized among geologists and palaeontologists. The rocks of each period may be arranged in one or more groups, according to palaeontologic distinctions.

Lastly, the units of the classification are as nearly as may be lithologically homogeneous masses, called formations. A formation is the result of essentially continuous physical conditions. Practically it is the smallest homogeneous subdivision of a heterogeneous rock series which the geologist finds it practicable to map. It is usually limited above and below by formations differing from itself according to the changes of conditions with which its development began and closed. It is recognized only so far from the type locality as it preserves its individual character, and is replaced in the cartographic scheme by another formation, or by several other formations, as the case may be, whenever the distinctive characteristics fail.

Thus a formation is defined by character, and not by the lapse of time. An example will make this clearer. The undertow retreating from a wave-beaten coast sweeps back sand and silt. The sand is dropped near shore; the silt is swept further out to sea. These deposits of sand and of mud, formed simultaneously, are sand and shale when they become rock. If the land subsides the sea advances, and in the course of ages the coarse deposits of sand are spread over a wide area. The corresponding fine deposits of mud are laid down over the sands, always a little behind the advancing sea-front; and when these are brought to view in land-uplifts we distinguish the sandstone and the shale as different formations. Each represents the duration of a physical condition (in this case proximity or remoteness of shore), but the epoch of sandstone making is not distinct from the epoch of shale-making. So great is the variety of littoral conditions that there may be areas where no sand was deposited, and then the shale alone is present; and others where no mud was spread, and then the rock is all sandstone. Nevertheless, the lithologic character of either shale or sandstone being continuous, the formation remains as a unit (an elastic unit) of classification.

The limitation of a formation to the area within which it retains its physical characteristics is a contradiction of the once prevailing assumption that the rocks of the earth's crust are disposed like the layers of an onion, and is a recognition of the fact that formations are intimately imbricated. They lie one overlapping upon another, merging gradually into a third, or splitting into thin layers which are interbedded with parts of a fourth. Irregularity and change, not regularity and constancy, characterize formations.

The field work.—The threefold classification, by genesis, by age, and by lithologic character, was made the basis of an elaborate scheme for representing on maps the origins, the geologic dates, and the relations of rock formations. But before the color scheme and its application are described some reference should be made to the geologic field work.

When the topographic map of any region has been prepared with accuracy and with adequate detail, the first step toward geologic work has been taken. The geologist ceases to be an explorer; he floats down no unknown canyon toward possible cataracts; but, equipped with the map, he plans his campaign to the best advantage and accomplishes his work with economy of time, effort and expense.

He first seeks to classify the various rocks of the district. He would ascertain the origin of each variety. Is the rock igneous? If so, was it of volcanic eruption, or was it intruded at a depth beneath the surface? Of what period was the eruption or intrusion? How is it related mineralogically to other igneous rocks? How is it related to the deposition of precious metals? Is the rock sedimentary? What, in that case, is its lithologic character? Was it deposited in lake, estuary, or sea? In what direction, and how far distant, was the land from which the sediments came? What was the physiographic aspect of the land, and what events of uplift or submergence introduced and limited the physical conditions determining the genesis of the bed, whether sandstone, shale or limestone? What life did the waters support, and to what period of the earth's history does the rock belong? What deposits of coal, iron, or other valuable minerals, are there in the rock, and how are they related to other rocks of the district? These and many other difficult questions tax the patience, observation, and trained imagination of the geologist as he traces the formations—many, it may be—occurring in a district.

The ease or difficulty of such an examination varies greatly with the nature of the country explored and the complexity of the geologic problems encountered. In the Appalachian ranges of Pennsylvania, Virginia, and Tennessee, the easily recognized sedimentary rocks occur in tilted layers which coincide with ridges and valleys. The characters of the rocks and their relation to one another are evident to any close observer, but the problems of geographic changes in the remote past which they record are of profound interest and difficulty.

In the bare, precipitous peaks of Colorado and Utah each rock-mass stands out clearly as a part of the denuded skeleton of the earth. Geologic investigations received a great impetus from the ideas gathered by the early workers in this fruitful field. But the history there recorded covers so large a part of the earth's development, the mingling of water deposits with the results of volcanic activity is so general and so complex, the growth and wasting of mountain ranges has so repeatedly taken place in that western region, that many years of patient work lie before the geologists who labor there.

In the northern portion of our country and in Canada some of the oldest known rocks extend beneath the general covering of glacial deposits upon which grows the dense forest. The visible occurrences of the rocks are limited and scattered, while their nature is greatly modified by changes through which they have passed. Here, more than anywhere else, geology requires the services of the most patient, painstaking seeker after truth.

These instances may suffice to suggest the nature of the investigations upon which the Geologic Atlas is based. It is founded on original work of the highest scientific accuracy.

The manuscript for the folios of the Geologic Atlas is begun in the camps which the Survey establishes each season in all parts of the country, the first draft of the map being generally prepared in the field; the final drafts for the engraver's use are made by the geologist after months of office study, or in case he has not the requisite skill, by an expert draughtsman and are submitted for editorial examination and criticism.

The color scheme ; Areal Geology.—It is the function of the editor to find modes of expressing, according to a consistent scheme of representation, the diverse facts of many districts and the views of many geologists. He is governed by regulations which constitute the "color-scheme," but he has constantly to remember that clearness and precision of statement are more important than any rules. If in any given area which had been mapped there occurred a broad expanse of gravel, and adjacent to it a stretch of thinly bedded limestone, the representation of these areas by different colors or by different devices would constitute a geological map, printed according to its individual scheme. Assuming that for reasons of economy but one color could be used, the suggestion lies close at hand, that the rounded gravel should be represented by dots and the bedded limestone by parallel lines, printed, let us say, in ashes-of-roses over the respective areas. Assuming that from some neighboring Vesuvius a lava-stream has flowed across the district; we may remember that rocks which cool from a molten condition readily break into triangular or rhomboidal pieces. Accordingly, a pattern formed of two or three sets of lines crossing in such manner as to form triangles or rhombs will serve to delineate the extent of the lava. It may well happen that in the same region there is an expanse of ancient gneiss, a rock marked by strongly crystalline texture. Seeking a means of expressing this character, we may find it in a uniform tint of color broken by short white dashes placed irregularly to simulate crystals. Thus, then, we shall have distinguished the gravel, a surficial rock, the limestone, a sedimentary rock, the lava, an igneous rock, and the gneiss, a metamorphic rock, by patterns of dots, of parallel lines, of triangles, and of dashes, all in ashes-of-rose color. The use of these suggestive patterns to represent respectively these four great classes of rocks is the fundamental principle of the Survey's color-scheme.

But ashes-of-roses is a delicate tint, and the pattern distinctions in that color would be rather indistinct for a useful map. Color strength and color variety are needed.

The word "color" covers a multitude of effects. To avoid ambiguity I shall use *hue* for that quality of color by which, for instance, blue is distinguished from green; *tint* for the result of adding white light, pink being a tint of crimson; and *shade* for the mixture of a hue or tint with black. Hues, tints and shades, merging from tone to tone of the chromatic scale,—all are colors.

It has long been the practice of makers of geologic maps to use certain colors for certain classes of rocks. For example, igneous rocks are commonly mapped in tones of red, suggesting the ruddy glow which they may once have given forth; but reds also suggest iron ores. Some geologists see sandstone in every spot of yellow on the map; others assume that yellows are used only to represent the more recent formations. Blue is intimately connected with limestone, and gray with coal. But these associations are personal and often contradictory; and even were they generally observed their adoption in any systematic scheme would present almost insuperable difficulties. In the Survey scheme the four genetic rock-classes are distinguished by patterns, in the manner already explained, and therefore the use of colors is freed from the limitations incident to the application of any one range of tones to a particular group of rocks. Dots, of whatever color, represent surficial rocks; parallel lines, of any shade, delineate areas of sediments; intersecting lines, of all hues, stand for igneous masses; dashes irregularly spaced, whether in lighter or in darker flat-tints, indicate metamorphism. Nevertheless, the geologist may not choose fancy free among the rich pigments of the lithographer's palette.

The sedimentary rocks are more strictly than any others grouped by age. It is of primary importance to distinguish strata of different ages, and it has repeatedly been suggested that the use of colors to represent geologic periods should be in the order of their sequence in the spectrum. This is adopted in the Survey scheme, strata of the oldest period being mapped by ruddy browns, and those of the successively younger periods being indicated by shades ranging through purple, blue, and green to yellow. The standard colors selected are indicated in the following table:

Formations	of the	Pleistocene period	Any colors.
“	“	Neocene period	Buffs.
“	“	Eocene period	Olive-browns.
“	“	Cretaceous period	Olive-greens.
“	“	Juratrias period	Blue-greens.
“	“	Carboniferous period	Blues.
“	“	Devonian period	Blue-purples.
“	“	Silurian period	Red-purples.
“	“	Cambrian period	Pinks.
“	“	Algonkian period	Orange-browns.
“	“	Archean period	Any colors.

It frequently happens that there are many, sometimes a dozen, formations of one period to be mapped distinctly, and this must be accomplished with one color. Two printings are used. The first is a faint flat-tint of the standard color. The second, on the same areas, is a dark over-print of the standard color in parallel lines, which are variously arranged in patterns of light hues with wide spaces, heavy lines with narrow spaces, or light lines and heavy lines in varied alternation. The effect produced is one of many tones of the standard color, which, being aided by the characters of the patterns, are sufficiently distinct, if the standard be dark enough. In consequence of this last proviso all the standard colors for the sedimentary rocks are of dark shades, heavily printed.

The treatment of the sedimentary formations is from certain points of view the least satisfactory part of the color-scheme. It limits the artistic possibilities and it makes difficulties in bringing out those formations which for various geologic reasons it is often desirable to emphasize. But the method possesses two very great advantages: By the use of one standard color for each period all the formations of any one period are grouped and the broad facts of distribution become strikingly conspicuous; and the employment of the same color in many maps to mean the same period of the earth's history, associates the color and the period so that the one suggests the other, just as a Continental uniform recalls the Revolutionary war.

Of igneous rocks, only a few marked types are distinguishable by the naked eye, but the varieties recognized by the microscope are very numerous, and new ones are constantly appearing. With all colors available for their representation, there has as yet been no attempt at a systematic scheme, and the colorist is free to choose according to the conditions of color-association in any particular map. The use of brilliant hues for igneous rocks is a natural result of the employment of shades for sedimentary strata, and reds are generally preferred, but there are many exceptions.

In the northwestern region of the United States there are thousands of square miles of lava, called basalt, for which orange is a preferred hue. But one shrinks from causing the Geologic Atlas to burst into flame. A delicate shade of warm dove color serves better as a setting for smaller expanses of other colors, as may be seen in the Lassen Peak folio.

In maps of the Gold Belt of California a standard shade of blue indicates large areas of sedimentary rocks of Carboniferous age; it cries out against a bright red for the lava-flows which buried and preserved the stores of gold in the ancient gravels, and these igneous rocks are accordingly printed in a subdued shade of pink. For further contrast, other igneous rocks are represented in these sheets by tints of golden-brown.

In the Livingston (Montana) folio the shades of standard red, blue, and green required to delineate strata of certain periods produced a map of sombre tone, which was lightened by introducing tints of violet and yellow for the igneous rocks. Examples might be multiplied to show the advantage of freedom in coloring the distribution of this great class of rocks, but the object is merely to indicate the principles which govern the application of the color-scheme.

The surficial deposits and the metamorphic rocks of unknown origin have not yet been mapped in sufficient variety to call for any special consideration. For the former a color-scheme is demanded by the students of the Glacial epoch and its records. It will be long before our knowledge of the latter taxes the possibilities of the art of map-making.

I venture to outline certain reasonings, in no wise new, which may appropriately govern color associations—at least in maps where distinctness is essential.

Of the three primary colors, red, yellow, and blue, each is the complement of the mixture of the other two, and the strongest possible color contrasts exist between the primaries and their complements. Thus:

Red contrasts with green.

Yellow contrasts with purple.

Blue contrasts with orange.

In this statement it is assumed that the green is composed of equivalent proportions of yellow and blue hues of equal intensity. It is obvious, then, that if the green should be more strongly tinged with blue its proper contrast would be the red correspondingly tinged with yellow; or if the green be of a yellowish hue, the red should have an equivalent admixture of blue. Therefore, as we pass from blue to green, the complementary hue tones from orange to red; grading from green to yellow, the opposite effects range from red to purple; whereas between yellow and orange the contrasts vary from purple to blue. These contrasts of primary and secondary colors are extremely effective, and may be avoided or selected as the occasion demands.

The same idea may be carried a step farther with less gaudy effects if we assume a standard green, a purple, and an orange, and oppose each of them to a neutral mixture of the other two. Thus:

Green contrasts with russet or ruddy-brown.

Purple contrasts with citrine or golden-brown.

Orange contrasts with olive or greenish-brown.

It is convenient to define russet as any combination of purple and orange; citrine, as any mixture of orange and cream, and olive, as any mingling of green and purple. To obtain a standard series, scales of russets, citrines, and olives were prepared as follows:

Standards of green, purple, and orange were obtained with ultramarine blue, cadmium yellow, and madder lake, and these were mixed in pairs in carefully measured volumes. The mixtures varied: in russets, from 5 of orange and 1 of purple by additions of 1 volume of purple to 5 of orange and 5 of purple, and then by subtractions of 1 volume of orange down to 1 of orange and 5 of purple; citrines and olives being similarly mixed, there resulted a range of hues which is definitely graded and affords the most pleasing color associations available for the maps.

Reference has been made only to the contrasts of brilliant hues, but luminosity is a quality of hues and tints in which they differ among themselves and which distinguishes them strikingly from shades, and these effects also enter into the consideration of color-schemes. In this paper, however, the subject of chiaroscuro must be dismissed without discussion.

Economic geology.—The areal geologic maps resulting from this color-scheme are of dark, strongly marked tones. They are open to the objection that geologic facts obscure those of topography, and to the more serious criticism that the mineral resources of any district are not particularly emphasized. The needs of the scientist and teacher are, however, served by such a map, which presents clearly the facts of geologic history, and any attempt to modify the representation in order to fit it to the wants of the mining engineer lessens its usefulness for this important purpose. But the processes of lithographic printing permit, without serious expense, the reproduction of the patterns employed in the areal map, in weaker tints. Accordingly, for all districts where the mineral resources justify the duplication, the areal map is printed in fac-simile, but in faint tints, and upon this base are distributed stronger colors, which represent the limited areas of productive formations. This may be better understood through an example.

In the Appalachian coal field the strata of the Carboniferous period are sandstones and shales, some of which contain valuable coal beds, while many others do not. These strata constitute formations, which are mapped on the areal geologic map in patterns of dark blue which distinguish the areas of each one from those adjacent to it, but which do not especially mark those that bear coal from those that do not. In the faintly colored fac-simile of the areal map all these patterns are reproduced, their differences being apparent on close examination; but the extent of the valuable coal-bearing formations is strongly brought out by additional flat-tints of one or more obvious shades.

In publishing such an economic map there is risk that its meaning will be misunderstood. It is necessary to point out the distinction between formations that contain useful minerals and those which, containing useful minerals, can be worked profitably. The former can be determined by observation, and the fact remains constant; the latter can be ascertained only after consideration of commercial conditions, which fluctuate, and influence the conclusion accordingly. The maps issued by the Geological Survey indicate the constant facts of mineral occurrence only; the variable facts of value lie in the province of the mining engineer.

Structure sections.—A geologic structure section is a drawing which shows the profile of the surface cut by a vertical plane and the relations of rocks traversed by that plane below the surface.

In some areas the formations which are delineated upon the areal and economic geologic maps extend over the surface and are underlain flatly by other strata; elsewhere the formations dip beneath the surface. Stratified deposits in any one locality usually hold a somewhat constant relation, each one to its associated strata. Upon the basis of this relation, if the occurrence of any stratum at a definite point on the surface is known, the relative position of any other stratum beneath the surface may be inferred. This is true whether they lie in horizontal or tilted positions. The approximation of these inferences to facts varies greatly; in simple cases their exactitude has often been proved by the sinking of shafts; in more complex structure unexpected disturbances are often exposed by mining, and the inferences drawn from surface appearances are shown to be erroneous. In igneous and metamorphic formations guesses at underground relations are purely hypothetical. Nevertheless, in the numerous cases where structure sections may be constructed with confidence, their value is manifold. In regions where strata carry coal, iron, oil, natural gas, or water under artesian conditions, a knowledge of the depth at which the valuable material may occur is of prime importance to development. And even elsewhere, in districts which yield no valuable mineral, inferences as to the structure of the earth's crust are of the highest scientific interest.

Accordingly, in the Geologic Atlas a sheet is arranged to delineate the distribution of formations underground as well as on the surface. It is called the *structure* sheet. Like the other geologic maps, it is based on the topographic map, but in the interest of clearness contours are omitted, and the representation of areal geology is generalized. Across this simplified geologic map one or more sections are printed, each one immediately next the line which indicates its geographic position. The space required for each section (a strip usually about an inch wide and a number of inches long) is obtained by omitting so much of the map. Thus in one view the structure sheet exhibits in horizontal plan or map the surface distribution, and in vertical section the underground distribution, of formations.

Descriptions.—The verbal descriptions in the Geologic Atlas are under three heads: there is a general explanation of the plan and subject matter of the Atlas; there is a geographic and geologic description of the region portrayed in the maps of each particular folio; and on the margin of each map is an explanatory legend, stating the meaning of the various conventions printed on the sheet.

The necessity for these elements of the Atlas arises on the one hand from the complexity of the subject treated, in a work at once so broad and so detailed, and on the other hand from the fact that few Americans are familiar with good maps. Railroad maps, State maps of small scale, county maps of large scale but no detail, and the maps of foreign atlases are the sources of geographic knowledge. A map which delineates not only every road and house, but also the form and elevation of the surface, is valued when understood, but is not understood until explained.

A feature of the exhibit made by the Survey at the Cotton States Exposition at Atlanta is a lithographic press, printing the Atlanta atlas sheet for free distribution; but the topographic map of this historic region where Sherman marched was but a maze of brown, blue, and black lines to the general public, who left it in constantly growing piles. In course of time an extended explanation of the work of the Survey and of the nature of the map was added on the back of these sheets, and finding in the verbal statement matters they could understand, the visitors carry away the maps by hundreds.

The general explanation of the scope and subject matter of the Atlas, that which is printed on the inside of the cover, was more critically prepared than any other part of the folios. At least twenty-five of the leading geologists in the United States contributed to the discussion of the first draft, and their suggestions were embodied in a copy which was repeatedly revised by Major Powell personally, or under his direction. The resulting explanation appears in the first twenty folios officially signed by him as Director.

The publication of this fundamental though elementary statement led to still further discussion, in consequence of which Mr. Walcott caused a rearrangement of the material and also a change in rock classification. In the former scheme, metamorphic rocks, even of known origin, were set apart as a separate class. In the now adopted classification sedimentary-metamorphic and igneous-metamorphic rocks are placed under the heads of sedimentary and igneous, respectively. There will long remain, more particularly among the more ancient formations, metamorphic rocks whose origin is not determined; these are grouped as Archean and unclassified crystallines.

In the prolonged discussion and repeated modification of this statement of geologic A, B, C's the condition of the science is illustrated. Through independent investigations, through official surveys, and particularly through the training and labors of many students in the great universities, geology is growing so fast that the text-book is superseded before it is off the press, and the explorers of to-day can only point the way for the advance to-morrow. Little geologic work is final yet. The Geologic Atlas is no exception, but, if kept abreast of knowledge up to the time of publication of each folio, it will contribute greatly to the progress of the science.

The special descriptions contained in any folio may relate to the province in which the district lies and to the particular district, or only to the latter. The manner of treatment has varied with authors and regions, there being no fixed rules to govern the analysis and arrangement of the geologic facts. In some cases the geologist in charge sums up the general history of the province and his assistants write separately of the details; in other cases the general history is incorporated in the account of local phenomena. But with this desirable freedom of treatment there is a rigid requirement as to style: the descriptions shall be so written that any intelligent person, though not conversant with geology, may follow their meaning. If in the interest of scientific precision technical terms become necessary, there shall in the interest of popular readers be an adequate explanation of them. The aim is to fit the folios for use as educational instruments, rather than primarily as scientific contributions. While no less truly scientific, they shall be practically useful. Huxley, who assumed as his life work the task of rendering science in popular terms, set a standard and left an ideal to be striven after.

The legend on the margin of a map is a classified list of the facts delineated therein and of their representative symbols.

It has been aptly said that a museum should be a collection of labels illustrated by specimens. This may be paralleled with much truth by saying that an atlas should be a series of legends illustrated by maps. According to the former statement, a curator knowing his particular subject should compile a consecutive series of labels and then seek specimens to put with them; and according to the parallel, the geologist should first classify and summarize his facts in a legend before proceeding to express them on a map. Mentally this is the procedure, but the reduction of the mental legend to visible form is usually carelessly done. It is as though an author wrote in Russian, and handed a reader ignorant of that language a fragmentary dictionary. In the Geologic Atlas much attention is given to the preparation of the legends, with a view to classify correctly and to summarize adequately the essential features of the topography and geology in each area.

The technical processes.—The Geologic Atlas in its present form is the result of copper engraving and lithographic printing in a division of the Survey established for the purpose. The technical execution is the very best, and has been made possible only by complete control of the processes through a chief engraver, whose interest prompts his ingenuity, which has never yet failed in adapting methods to the demands of geologic representation. Under the contract system elsewhere prevailing in Government work, the elaborate experiments, the frequent revision of proofs, and the uniformly high standard of published maps would be impossible, while the cost would exceed that at which the folios are now produced.

The basis of the work is the topographic map, for which three copper plates are engraved. On one plate are cut all the data to be printed in black on the map; another receives all the lines to be indicated in blue; and a third, all the lines appearing in brown. To print the topographic maps an impression is transferred from each of these plates to a separate lithographic stone, which is placed in the press and inked with the appropriate color. Every sheet of paper is then run over the three stones, receiving three distinct impressions, which constitute it a map. In all such printing it is essential that each impression should fit exactly with all other impressions.

The geologic data are likewise engraved on copper and transferred to lithographic stone; the elaborate patterns are transferred from copper plates or from stone to other stones, with great precision, and the fourth or fifth proof sent to the editor is a map printed in all the selected colors from as many stones. There may be only a few colors; there may be twenty or thirty. Each one requires a separate printing, and each printing must exactly fit all the others. To pass a large sheet of paper twenty times through the press and each time to place it within a hundredth of an inch of its previous position is difficult, and in handling 4,000 to 5,000 copies a day the most expert feeder occasionally fails. But in the matter of register (as this fitting is called), and in cleanness, sharpness, and precision of execution, the maps of the Geologic Atlas of the United States challenge comparison with any other work in this country or in Europe.

THE AMERICAN ASSOCIATION.

The American Association for the Advancement of Science held its 44th meeting in Springfield, Mass., beginning with the Council meeting on August 28. The amendment of the Constitution which was proposed at the last meeting, whereby a new section was to be added,—J, Geography,—was not adopted by the Council owing to the insufficient number of papers on strictly geographical subjects. Papers which would have been assigned to this section were read in Section E or in Section H.

At the first general session, on August 29, the President-elect, Professor Edward W. Morley of Cleveland, was introduced and replied in earnest and appropriate remarks to the addresses of welcome from the Mayor of Springfield and the President of the Local Committee.

Dr. D. G. Brinton, the Retiring President of the Association, although unavoidably detained in Europe, forwarded his presidential address on "The Aims of Anthropology" to be read before the Association. Dr. Brinton designated anthropology as a branch of human learning which undertakes to make a study of man's nature, "its needs and its weaknesses, and how best to satisfy the one and amend the other." In the address the term anthropology was used in the sense adopted by this Association, that is, to include "the study of the whole of man, his psychical as well as his physical nature and the products of all his activities whether in the past or in the present." The study of man in relation to his physical traits, his ancestors, and his environment, might be called "biology as applied to the human species," and it forms the basis of the study of ethnography or the division of man into races or varieties. The author referred to the psychical traits of man as being even more important than the physical characteristics, in this study. The psychical or mental nature of man is shown in his works, his social and religious customs and in all his arts, whether for use or ornament. A comparative study of the results of man's psychical nature must be carried back to prehistoric times. "The most ancient is the simplest and the simplest is the most transparent and therefore the most instructive." Dr. Brinton stated that from the study of this branch of anthropology,—prehistoric archæology,—we have learned that the earliest man was the lowest man, the nearest to the brute creation, and have therefore disproved the theory that "the primal man had fallen from some high estate." He dwelt upon his belief in the "psychical unity" of man, "The parallelism of his development everywhere and in all times." He believes that "scarcely anything but his geographical environment, using that term in its broadest sense, seems to modify the monotony of his creations."

The author also drew attention to the importance of the study of folk-lore in reconstructing the story of the past.

The "immediate aims" of anthropology were summarized as follows: "The collection of accurate information about man and men, about the individual and the group as they exist now and as they have existed at any time in the past; here where we are and on every continent and island of the globe."

Dr. Brinton urged the importance of instruction and training on the part of those engaged in exploration and research in the various fields of anthropological science. He mentioned the fact that heretofore our universities and institutions of higher learning have given no attention to this line of instruction,—"how to observe, how to explore and collect in this branch."

The division of ethnology was defined as the "application of the principles of inductive philosophy to the products of man's faculties." "Its aim is to compare dispassionately all the acts and arts of man, his philosophies and religions, his social schemes and personal plans." While firmly believing in "culture identities," Dr. Brinton denies that all races are equally endowed. Differences of physical characters and of mental temperaments and inherited tendencies necessarily cause distinctions between the various ethnic groups; and a careful study of these peculiarities is one important aim of modern ethnology. This he considers the practical side of the science of anthropology, and it is only upon the results of this study that true legislation of a people can be founded. The science of anthropology has for its practical aim the increase of higher civilization, drawing upon the past as well as the present for a knowledge of the results and the forces which will best contribute to hasten the progress of civilization. Dr. Brinton believes that in the future, political economy, like history, will have to be rearranged on lines which this new science dictates. The final aim of anthropology he describes as offering to man "a knowledge of what he has been and is . . . revealing the future by the unwavering light of the past . . . conducting him by sure steps upward and onward to the highest summit which his nature is capable of attaining."

Seven Vice-presidents delivered addresses in their respective sections. Major Jed. Hotchkiss of Staunton, Virginia, Vice-president of Section E, spoke on the "Geological Survey of Virginia, 1835–1841, its history and influence in the development of geological science."

Mr. Frank Hamilton Cushing of Washington, Vice-president of Section H, read an extremely valuable paper on the "Dynasty of the Arrow." Mr. Cushing gave a sketch of his long and patient study of the arrow, beginning at the age of ten years, when a ploughman tossed him "a little blue flint arrow point and said, 'The Indians made that; it is one of their arrow heads.'" This little arrow point, he said, impressed him so deeply that it decided the purpose of his whole life. After making a collection of some hundreds of relics, he began a series of experiments to learn how the arrows were made. These experiments were described and illustrated during the lecture. While yet a boy he succeeded in making flint implements of the same form as those made by the primitive people; but he did not at the time know that he was the first white person to discover the method of making these crude implements. He attributes his success largely to the fact that he worked with the same rude tools and materials, and chanced to follow the same course that primitive man must necessarily have followed in fashioning his implements. From these experiments, continued for many years, and from his researches and his life with "an archaic people," Mr. Cushing was able to give the most interesting and concise account of the primitive method of making arrows. He narrated in detail the curious customs and superstitious ceremonies which attended each step of the process. The arrow, he said, is one of the most ancient things that men have made, much more ancient than the bow, and for ages it held remarkable sway over the destinies of man. Mr. Cushing then demonstrated how early man must have soon discovered the advantage of fastening his stone point into a handle, and thus have discovered the handled tool, and later the spear, the harpoon, the dart-flinger, and the bow. From his own experience, Mr. Cushing is convinced that palæolithic man of the French caves, who is supposed to have known no other art than that of rudely breaking a stone into shape by blows of other stones, could not have long remained in this rude state.

Professor F. W. Putnam, Permanent Secretary, spoke extempore in Section H on "Some Symbolic Carvings from the Mounds of Ohio, principally from the Turner and Hopewell groups," and gave certain conclusions drawn from long continued comparative study. To Mr. C. C. Willoughby, his assistant in the Peabody Museum, credit was given for valuable work in connection with this study during the past year. The colored diagrammatic drawings which illustrated the remarks were the work of Mr. Willoughby. One of the specimens chosen for illustration was a remarkably fine piece of incised work on the polished surface of a piece of human femur. An enlarged drawing plainly showed the motive of the carving which comprises human and animal faces, ovals, circles and other symbolic designs. At first glance a hopeless medley of lines, this carving finally resolves itself into several distinct masks and head-dresses together with the serpent and sun symbols. Professor Putnam considers it an interesting and significant fact that the designs on this carving are repeated in the forms of objects found in the same mound. Among these were many designs "cut from thin sheets of copper made by hammering nuggets of native copper," and several of them correspond with the designs in the carving. The most striking resemblance was found in one of the masks which, in the carving, is surmounted with a head-dress in the form of a deer's antlers, while in the mound was found a skeleton having over the skull a head-dress of copper and wood made in this same form with the branching antlers. Several other specimens were alluded to and illustrated. One on the arm bone of a man represents several animal heads interwoven in a curious manner, and over each head are the symbolic designs, ovals and circles, common to nearly all the carvings. These lines are arranged in such a fashion that portions of each head form part of another above or below, and the reverse of the carving shows still different heads. Another specimen shows the conventionalized serpent, and the bear totem as represented by the five claws. Others represent artistic conventionalized forms of birds and animals. A serpent cut out of mica was found to have symbols carved upon it which are identical with those upon the pieces of bone. Two duplicate carvings on circular portions of the parietal bones of a human skull, Professor Putnam considers really fine work; and Mr. Cushing stated that certain symbols in this carving represent the Zuñi gods of day and night.

Special reference was made to the stone known as the Cincinnati tablet, and Professor Putnam said that this specimen, although often described as a fraudulent piece of work, was undoubtedly genuine, since "several of the strange figures carved on the stone are of the conventionalized serpent form common in the mounds of Ohio and also agreeing essentially with the serpent head symbol on the old stone sculptures of Central America, which resemblances were not before known." This stone was also shown to have lines identical with those on a piece of copper found in the Hopewell group. In connection with the plumed serpent Professor Putnam and Mr. Willoughby have made many comparisons showing the modifications in the representations of the serpent in ancient art, from Ohio through the pueblo tribes of the southwest to Mexico and Central America.

While the primary object of his remarks was to "illustrate some of the peculiarities of the art of incised work of the older people of the Ohio valley, and to point out the close resemblance in the motive of the symbolism expressed in the carvings from this region with those of the southwest and even of Central America," Professor Putnam touched also on the question: Who were the builders of the ancient earth-works of the Ohio valley? He emphasized, first, the necessity of distinguishing between these old earth-works, and the mounds and village sites of later intrusive tribes from the northward and eastward. Second, he called attention to the fact that the elaborate and intricate designs and delicate workmanship of the carvings he had illustrated necessitated a high degree of skill, ingenuity and patience for their conception and execution, combined with a certain religious cult expressed by the symbols in the carvings, and he claimed that no such work had ever been done by the dolichocephalic tribes of the northern and eastern portions of the United States, nor had any such specimen ever been found in the burial mounds of later date. Third, a study of the skulls and skeletons found in the old mounds and earth-works shows that the builders closely resembled the people of the southwest and of Mexico and Central America, and differed from the long-headed stock of the east and north. His convictions, after more than twenty-five years of exploration and study, are that the builders of the old mounds and earth-works of the Ohio valley "were probably a branch of the great southwestern people represented by the ancient Mexicans, the builders of the old cities of Yucatan and Central America, and some of the pueblo tribes of Utah, Colorado, Arizona and New Mexico and adjoining portions of old Mexico." He believes that a few particular customs, ceremonies and phases of art, found among the living tribes to the northward and eastward of this great region, are simply survivals by contact of these tribes with the short-headed peoples of the southwest, of which stock he considers the old earth-work builders of the Ohio valley to have been one extreme branch.

The close relation between geography and anthropology was shown in a paper read in Section H by Dr. William Z. Ripley on "A Study in Anthropo-geography as a branch of Sociological Investigation." Colored statistical maps illustrated the geographical method of study, and showed the influence of geology and topography in affecting the distribution of the ethnic elements. Without reference to these maps an abstract of the paper would be unintelligible.

Mr. Gardner G. Hubbard's paper on Japan, read in Section E, began with a description of the physical geography of the islands forming the Empire of Japan. Reference was made to the unusual facilities for commerce afforded by the numerous inland waters, bays, gulfs and harbors. An account was given of the former and present races of Japan; and of the government of Japan from a period prior to 1850 down to the present constitutional form of government. The question was discussed, whether it is wise for the Japanese to adopt our form of government or modify their own by ours. Attention was drawn to the rapid growth of the mining and manufacturing interests of Japan and their probable effect on the manufactures and trade of England. "Japan" it was said, "can easily supply the Pacific Coast with manufactures, while the Pacific Coast and the Gulf States, through the Nicaragua canal, can supply fruits, provisions, grain and cotton to Japan, thus supplying a large outward and homeward commerce for our vessels plying the Pacific Ocean."

Mr. Horace C. Hovey presented in Section E an interesting paper on the Isles of Shoals. These islands, he stated, were discovered by Captain John Smith in 1614, and were originally called Smith's Isles. They are nine in number, and nine miles from Portsmouth light. Five belong to Maine and four to New Hampshire. In 1800 the group was surveyed, showing Appledore Island to have 350 acres; Star Island, 150 acres; Haley's Island, 100, and the others less area. There is a light-house on White Island. Haley and Malaga are joined by a sea wall, making a safe harbor. Mr. Hovey has made preliminary investigations on these islands with the intention of continuing the study in the future. Among his contributions to the knowledge of this group is the statement that Star, Haley, Cedar and Malaga islands seem to be steadily rising at the rate of six feet in fifty years, while the others of the group are either stationary or sinking. He called particular attention to a singular column on Appledore Island. "The column protrudes through biotite gneiss, softer than itself, and the gneiss lies between walls of white granitic rock harder than itself." The diameter is eleven feet, and the original height was probably from twenty-five to fifty feet. It is strictly hexagonal. He also described a striking dyke of porphyry on Cedar Island stretching from shore to shore; and stated that garnets from one to four inches in diameter are found on Appledore Island.

Professor William M. Davis gave one of the evening lectures tendered by the Association to the citizens of Springfield. His subject was, "Geographical Development of the Connecticut Valley," and the lecture was profusely illustrated with fine lantern pictures. He first described how the valley was formed, and called attention to the fact that the lowland, which extends from 15 to 20 miles in width at Hartford to that of a few miles, or even a mile or less at the north and south, is a very industrious region with thriving cities and towns like New Haven, Hartford, Springfield, and others, while in the upland to the east and west are found rural dwellings, old country roads, and often dilapidated and deserted farm houses. We find that the people of the upland send their children to the lowland for their education, and the census reports show that during the past few years the population of the upland has been slowly decreasing, while that of the lowland has been increasing. These facts show us how geographical features have their effect on the condition of man, physically, mentally and socially.

Professor Davis described the upland as an old mountain chain worn down to a comparatively even surface, with here and there a high peak like Monadnock, which has not been worn down as much as the other portions owing to the hardness of the rock. The valley, he said, means that the highland having been once reduced to the sea level has been raised up and the streams have cut through making the valleys. The valley is deep where the stream comes from an upland which is high; and the breadth of the valley depends upon the nature of the rock. The Connecticut Valley is very broad and deep because the sandstone through which the stream flows is soft and easily washed away.

The second evening lecture was given by Mr. Cornelius Van Brunt on "The Wild-flowers of the Connecticut valley." The primary object of this lecture was to exhibit the series of beautiful lantern slides made from photographs taken by Mr. Van Brunt and colored from nature by Mrs. Van Brunt. As each familiar flower appeared on the screen the lecturer made running remarks on its geographical distribution, habits and peculiarities.

The third public lecture was given by Professor A. S. Bickmore on the Illustrative Method of teaching Geography and Zoölogy at the American Museum of Natural History in New York City. This new method of "visual instruction" has been introduced into the public schools of New York State. It is given by means of lectures accompanied by pictorial illustrations. The sum of $25,000 a year for three years beginning with January 1, 1895, has been appropriated by the State of New York to provide the means of carrying on this instruction under the superintendence of Professor Bickmore of the American Museum, who gives his services without compensation to this good work.

The Springfield meeting, although not large in the number of attendants, was pronounced an important and successful one. The forty-fifth meeting of the Association will be held in Buffalo, beginning on Monday, August 24, 1896, under the presidency of Professor Edward D. Cope.

TOPOGRAPHY AND SCENERY OF NORTHERN INDIA.

A LECTURE BY

HERBERT M. WILSON.

Though the subject of my lecture is the topography of India, I shall not confine myself strictly to that theme lest I should weary you with dull details. After briefly describing the general topographic characteristics of India, I propose to acquaint you in greater detail with the topography and scenery of the Himalayas, the grandest mountain range in the world, and one of which the people of this country know the least.

In shape India resembles a great triangle, whose base is the Himalaya Mountains, while its apex juts far south into the Indian Ocean. Its western side is washed by the Arabian Sea and its eastern by the Bay of Bengal. It extends from the 8th to the 35th degree of North latitude, from near the hottest regions of the equator to well within the temperate zone. Its length from north to south and its greatest breadth from east to west are both about 2,000 miles. The total area of the peninsula, including British Burma, is about 1,560,000 square miles, of which 965,000 square miles is composed of 16 provinces directly under British administration, the remainder being divided into about 150 feudatory states which, equally with the British provinces, acknowledge the paramount sovereignty of the British crown. In addition to these there are on the west coast, Goa, Diu and other small Portuguese possessions, including 1605 square miles; and Pondichery and several other small possessions of the French, including 203 square miles.

Outside the presidencies of Bombay and Madras, the principal British provinces include Bengal, the Northwest provinces, Punjab, Burma, and others. Among the native states are Kashmir, Rajputana, Gwalior, Jodhpur and others in Northern India, and Travancore, Mysore and the Nyzam's dominions of Hyderabad in Southern India. The total population of India is 287,000,000 of people, of whom 221,000,000 reside in British territory and the remainder in the native states.

India includes within its borders a great diversity of topographic features. It possesses the greatest continuous mountain range, the highest mountain peaks and some of the mightiest rivers and broadest plains in the world. On the north, the Himalayas, which name means "dwelling place of snow," form a great mountain barrier which shuts out the rest of Asia and forms a controlling factor in the climate and physical geography of India. This range of mountains is 1,500 miles long and may be likened to the Sierra Nevada, bordering the eastern side of the California Valley in its general appearance and topographical relations to the Indu-Gangetan Valley. Behind this range is a high plateau, comparatively arid and corresponding to the Nevada deserts east of the Sierras. While the elevation of Mt. Everest is 29,002 feet, other mountain peaks above 20,000 feet in elevation abound in all parts of the range. There are numerous well-travelled trails leading across the Himalayas through Kashmir and Nepal to Tibet and China, the passes on which are from 15,000 to 19,000 feet in elevation, and in journeying over these the traveller remains for days at altitudes above 13,000 feet.

The second great topographic division of India is the valley or rather plain of the Ganges and Indus rivers, lying immediately south of the Himalayas, and between them and the third topographic division, the Deccan, which includes all its lower or peninsular portion and consists of an elevated high plateau strewn with many irregular mountain ranges and mesas.

The foothill slopes of the Himalayas rising to the northward of the great Indu-Gangetan plain may be described as consisting of two series of ridges or spurs, the first and lower called the Siwalik Hills, varying in height from 3,000 to 4,000 feet. These are low ridges running parallel to the main trend of the Himalayas and separated from them by a disconnected line of valleys from 2,000 to 2,500 feet in altitude and called the Duns. Above and north of the Duns rise the first spurs of the Himalayas, which ascend abruptly to what may be described as a bench, having along the whole southern face of the Himalayas a generally uniform altitude of 6,500 to 7,500 feet. This bench is sometimes called the Sub-Himalayas and from it the long sloping spurs rise gradually and rapidly to the higher summits of the main mountain range.

The Great Northern Plain, through the centre of which flow the Indus and Ganges rivers, lies, as I have before said, immediately south of the Himalayas. The Indus, rising to the northwest of the centre of the Himalayas, flows southwestwardly toward the sandy deserts of Sind. The Ganges and its principal tributary, the Brahmaputra, drain the southern and northeastern slopes of the Himalayas. The former flows through a great plain a thousand miles in length, and the latter through the valley of Assam for a distance of several hundred miles to its junction with the Ganges near Calcutta.

As before stated, the great Gangetan plain and its neighbor, the Himalayas, at once remind the traveller of the California Valley with the Sierra on one side, and on the other the Coast Range, which has its counterpart in the Vindhaya Mountains separating the great plains from the Central Indian plateau. Sind (the Lower Indus Valley) is similar in many of its topographic features, and particularly in its soil and climate, to that portion of Southern California and Arizona through which the Colorado River flows. Were the precipitous bluffs and the various mountain ranges bordering the edge of the Colorado removed so that that river flowed through the deserts at a level with the surface of the surrounding country, we would have an exact duplicate of the Indus Valley.

Central and Southern India has its counterpart in the United States in the canyons and mesas of northern New Mexico and Arizona. Great buttes and table lands stand out with bold precipitous sides above the surrounding valleys and plains, the hills being covered with a thick growth of small, scrubby trees, while the valleys are comparatively barren of vegetation other than grass and small brush.

The lower portion of the peninsula consists of a slightly elevated plateau bordered on the north by irregular ranges of mountains, the Vindhayas, varying in elevation from 2,000 to 5,000 feet above the sea and separating it from the northern plains. The eastern and western edges of this plateau are bordered along the coast by two mountain fronts or plateau edges called the Ghauts, (meaning "steps.") Of these the western Ghauts are the higher and more continuous, the slope and drainage of the peninsula being from these, eastward to the Bay of Bengal.

And now let us assume that we have landed in Bombay, the second city in India, and that at which the traveller first arrives after journeying through the Suez Canal and the Red Sea from Europe. Bombay is situated about midway north and south of the west coast of the peninsula; thence radiate railway lines northward to the Indus Valley and Afghan frontier; northeastward to the great valley of the Ganges and to Calcutta; eastward to Madras, and southward to Travancore. We might take rail to Calcutta, near which place, at Benares, a railroad branches northward to the foot hills of the Himalayas, whence a short journey over a steep, narrow-gauge railway, would take us into Darjeeling, one of the summer hill stations of the British Government, under the shadows of Mts. Everest and Kanchanjangá. By preference, however, we will take the Baroda line, which goes due northward through the Central Provinces of India, and after stopping at Ahmedabad for a detour into the Indus Valley, we will continue northward to the Himalayas, which we will reach near the point where the Ganges leaves them. From this point a short journey over excellent hill roads will convey us to Simla, Mussoorie or Chakrata, hill stations of the Government. Here we plunge into the higher Himalayas, across which we will proceed into Tibet, and back along the head-waters of the Indus into the Indus Valley west of Simla.

While the street scenes of the new quarter of Bombay are interesting to the European, and we are astonished at the magnificence of the Government buildings constructed by the British, the most interesting part of the town to us is, however, the native quarter, where we are for the first time introduced to native architecture, though in its least attractive and most business-like form, and to the unique and curious costumes of the inhabitants of India. A few of the streets of the native portion of Bombay are broad, while all are well paved. Though we here see some of the peculiarities of native architecture as represented in stores, and some of the strange costumes of the people, the city is so Europeanized that we scarcely realize that we have reached an Oriental land.

Having satisfied ourselves with Bombay and prepared for our journey, we proceed to the Victoria Railway station, one of the most magnificent railway buildings in the world, made of solid sandstone and marble, elaborately carved and adorned with statues. The waiting-room in the interior of this building is constructed of variegated marbles and onyx, highly polished and carved by native workmen into quaint shapes of indigenous animals and birds.

As our train hurries us out of Bombay, we at once begin the ascent of the Western Ghauts, a long, rugged range of low, wooded hills which border the western coast of India, and in passing through which we view some of the most magnificent railway scenery in the world. The summits of these hills, which are of volcanic rock, are from two to five thousand feet in altitude, and consist of mesa-like mountains similar to those of the central arid region of this country. The arid valleys between the hills generally contain streams which are utilized for the irrigation of the land, while the hills themselves are clothed with a scrub brush or jungle of low trees, and are occasionally surmounted by forts and castles, from which the native chiefs once dominated the surrounding region.

Continuing northward, we pass the summits of the Ghauts and enter the great Central Plateau, which is practically level, though broken occasionally by irregular ranges of hills, mesa-like in shape. The whole of this country is well inhabited by an agricultural people, who laboriously raise their crops from the arid soil by the aid of irrigation, the water for which is largely supplied from wells and storage reservoirs. After a short journey, we reach Ahmedabad, where we obtain our first view of a truly native city. Ahmedabad is noted for its carpet-weaving industries and the manufacture of silk and textile fabrics. Its stone and cement buildings are adorned with magnificent wood carvings, the most beautiful in India, and from this neighborhood handsome carved screens, chairs and sandal-wood boxes are exported.

At Ahmedabad let us make a detour westward into the lower Indus Valley, in order that we may examine some of the peculiarities of its topography. East of the Indus, in Rajputana, we enter one of the most dismal and forbidding deserts in the world. It consists of shifting sand dunes, constantly moving with every wind and banking up against the few rocky hills which protrude through them. Yet, dreary as is this region, water is found here and there in wells, and it supports a scattered nomadic population.

Continuing to the Indus Valley, we observe the erratic course of the river, and are impressed by the density of the population and the level character of the plain. This country is similar to that along the lower Colorado and Gila rivers in the neighborhood of Yuma. To the west of the river we see the foothills of the low mountain range which separates India from Baluchistan and Afghanistan, and in which are found the celebrated passes of Quetta and Kohat into which the British have built railways toward Afghanistan.

Proceeding now directly to the Ganges we observe that its great valley is well watered. It is as level as and may be well likened to the Mississippi Valley and that of the Sacramento. It is densely inhabited by a people who subsist on the products of agriculture raised by means of irrigation from the grand canals which traverse it. Crossing this valley, we disembark at Rurki, at which place the Ganges Canal is carried over the Solani River in a superb masonry aqueduct. From this point a short journey up the Ganges Canal takes us to Hardwar, one of the Holy Cities of the Hindu people, situated at the point at which the Ganges bursts through the last foothill range of the Himalayas and enters the plain. Here is diverted the great Ganges Canal, which waters about 5,000,000 of acres in the valley below. Hardwar is a pretty little city, situated on the banks of the Ganges and nestling among the rocks of the Siwalik hills. In it are to be seen all the varieties of Indian architecture, as each religion in its turn has left its mark upon the buildings. To this place flock annually hundreds of thousands of pilgrims, who come to throw the ashes of their dead into the river, to bathe in its holy waters and to be absolved of their sins at such price as the Brahman priests think they are capable of paying. A unique sight on the Ganges at Hardwar is a milkman, whom we see here floating to market on a raft, consisting of eight empty American kerosene oil cans and one other filled with milk. After emptying the filled can he packs all nine on his head and trudges back to his farm in the hills.

Having gotten a brief view of the Ganges at this interesting point, we will proceed by rail directly to Saharanpur, a city of several hundred thousand inhabitants, where we will procure our outfit for the long foot journey through the Himalayas. At our disposal will probably be placed an *ekka*, one of the native, bone-breaking carts of this region, a vehicle without springs, and in which the rider must sit cross-legged on the few slats which form its body. A trial of half an hour, even over the smoothly paved streets of Saharanpur, will convince us that we must use some other form of conveyance. In the distance one of the persistent gharrymen of India, quite as obstreperous as the hackmen of our country, is bringing us a fairly comfortable conveyance, a hack made by native workmen, which has springs beneath it, and in which one can journey with some comfort.

I would be loth to advise any one to use that imposing conveyance, the elephant. Such little experience as I had on these animals was not sufficient to break me in to the roughness of his stride. The ordinary method of mounting him is, as we see, by stepping on his heel, then upon his tail, which a native holds for us, thence by clambering upon his back. After we reach there, however, the worst of the performance is yet to begin, for as he raises first one of his ponderous forefeet and then the other, we sit on an incline more steep, and as it is living, more terrifying than the steepest roof in New York. In another moment up comes one of his hind feet, which throws us at an awkward angle, then he raises the other, and, if we have managed to cling to his back through this performance, we find ourselves in a fairly level and comfortable seat. But the moment he starts off we realize all the terrors of elephant travel, for as he lifts each mighty limb in succession, that portion of his body above it rises and falls through two or three feet of altitude, and gives us such a shaking that I can only liken it, not to a ship at sea, but to such a tossing as the darkies of the South used to be regaled with by our soldiers in war times, when they were tossed in blankets for the edification of the camp.

Having decided to make our journey on horseback, we procure some excellent ponies and a number of porters to carry our baggage (for these native porters, or runners, will travel as fast as our horses and keep up with them all day over hilly roads) and start on our journey. We are at once impressed by the magnificence of the roads, which are built by the British engineers, and stretch for miles between the main cities of India, shaded on both sides by grand avenues of trees.

Let us pause here and glance at the region which we are about to enter. Near the eastern extremity of the Himalayas, in Sikkim and Nepal, to the northward of Bengal, there is no subsidiary range of hills at the foot of the Himalayas. Here the main range is but 60 to 80 miles wide from the Gangetan plain to the highest summit. At the foot of the mountains, between the Ganges and Brahmaputra rivers, is a broad belt of flat, low-lying, marshy country, moist and malarious at all times, and covered with a dense growth of reeking jungle; this region is the Tarai. North of it the Himalayas rise in long, steep ridges, unbroken by cross ranges, directly to the highest summits.

The topography of the central and western Himalayas is very different from and more complex than that of the eastern end of the range. At the foot of the Himalayas are the Siwaliks, a range of low ridges, the trend of which is parallel to that of the main mass of the Himalayas, northwest and southeast, but practically at right angles to the trend of the ridges of the Himalayas, which run from the summits southwestward toward the Gangetan plain. Nearly parallel to the Siwaliks and between them and the lower, or sub-Himalayas, are a series of long, narrow valleys, called Duns. The Siwaliks are from three to four thousand feet in height and the valleys or Duns have an average elevation of two thousand feet.

Beyond the Duns are the lower slopes of the Himalayas proper, which rise continually in long parallel ridges, separated by the various river channels which flow from the mountains, until the extreme summits are reached at altitudes of from 18,000 to 27,000 feet. At from 5,500 to 7,500 feet the regularity of these ridges is broken by a series of hills or knobs separated by irregular flats, and this bench, if it may be so called, is ordinarily styled the sub-Himalayas. On various portions of this bench are the hill stations of Simla, Mussoorie, Chakrata and other summer resorts of the Anglo-Indian Government.

Above the sub-Himalayan bench the ridges rise steadily to the summits of the southern or snowy range of the Himalayas, in which are situated Gangotri, Badrinath, Kedarmath and others of the celebrated peaks at the head of the Ganges and Indus rivers, which reach altitudes of from 22,000 to 24,000 feet. To the north of this range, great, deep, V-shaped valleys are crossed, in the bottoms of which run the Sutlej, Chandra and Jehlam rivers and other branches of the Indus, and beyond these are the northern Himalayas, broken up into many irregular mountain masses reaching to altitudes nearly as high as those of the southern range, though the summits of these northern mountains have less snow and ice upon them. North of this northern range are the great table lands of Tibet, Gobi and numerous smaller elevated plains, and west of these are the Karakorum Mountains. Among the highest of the elevated plains is the Hundes—the land of the Huns—which is almost directly north of Simla. The highest portion of this basin reaches altitudes of from 12,000 to 16,000 feet, and is generally a bare, bleak plain in which the Sutlej and Chandra rivers have eroded deep gorges. As seen in bird's-eye view, the Hundes consists of an interminable succession of ravines and steep cliffs, cut deeply in what at a distance appears to be a level expanse of country, in which all the lower ridges and irregularities seem to disappear. It is all of a brownish or greenish-brown color, due to the patches of gravel breaking through the bright green pasturage. In general appearance this region is much like the excessively eroded plateau country along the Musselshell and Yellowstone rivers in eastern Montana and the Little Missouri in western Dakota.

North and west of the Hundes are the Karakorum Mountains, which form the southeastern bulwark of the Pamir. In these mountains are some of the highest peaks of the Himalayas, one of which as yet unnamed, but marked on the Government maps as "K-2," is the second highest in the world, reaching to an altitude of 28,278 feet. South of the Karakorum Mountains are numerous elevated basins, too large to be called valleys, and which yet cannot be called plateaus, as they are surrounded by still greater heights. Of these the Hundes is one, while another, though lower, is the celebrated Vale of Kashmir, about 100 miles long by 50 miles wide and between 5,500 and 6,500 feet in altitude. The slopes of this valley are surrounded by level terraces, apparently old lake shores, below which the valley bottom is of alluvial sand

and gravel, its centre being occupied by Walen Lake, 6 by 10 miles. The climate of Kashmir is delightful. In spring the valley is fresh, green and smiling and surrounded by a noble belt of glistening, snow-capped mountains. In autumn the eye is filled with a wonderful richness of many-colored foliage, and at all times the placid river Jehlam flows smoothly on between stately groves of plane trees.

While there are many deep gorges cut by the rivers flowing southward from the Himalayas, such as the gorges of the Ganges and Sutlej rivers, these are but mere indentations in the surface of the earth as compared with the enormous depth of the gorges cut by the Indus below Gilgit. In one place the river flows in a narrow canyon, the bed of which is less than four thousand feet above the sea, while the precipices which form its sides rise abruptly to altitudes exceeding 20,000 feet; at Nanga Parbat Peak to a height of 26,620, thus making the canyon below Gilgit from 17,000 to 22,000 feet in depth. Above Gilgit, Rakipushi Peak rises to an altitude of 25,500.

Great varieties of climate are found in the Himalayas. In their eastern portion in Sikkim, the rainfall is very great. It is near here, in Assam, that the greatest precipitation in the world occurs, over 600 inches having been recorded in one year. In their western portion the rainfall is from 40 to 60 inches in the sub-Himalayas, and increases to perhaps 100 inches near the summits of the outer or southern range; thence the rainfall steadily and rapidly diminishes to the northward until there is almost a total absence of rain in the Hundes and north of them toward Gilgit. The climate of Kashmir is celebrated for its mildness, yet just to the north of it the dryness of the air and the depth of the gorges of the Indus and Gilgit rivers allows the sun's rays, beating down on the bare gneiss and sand, to produce an almost unbearable heat. In the higher plateau lands, while the summer temperature by day is excessive, at nightfall it sinks rapidly to many degrees below freezing.

And now let us resume our journey where we left it in Saharanpur. As we enter the Siwalik Hills we observe the character of the sandstone and conglomerate rocks which form them, and the low growth of scrub timber, which reminds us at every turn of the hills of northern New Mexico and Arizona. There are none of those extended views which are to be seen in the higher Himalayas, but there is a soft beauty and richness of sub-tropical flora which these do not possess. The more prominent of the trees are the Sal, a variety of the Lac tree, the Sissoo, Bamboo and many similar woods. Orchids clothe the trunks of the trees, below and between which is a dense growth of rhododendrons, ferns and other low bushes. The fauna is exceedingly varied, the less frequented portions of the Siwaliks and Duns being a veritable paradise for the sportsman. Of the larger animals, the elephant, tiger, leopard and several varieties of bear are numerous, while guinea-fowl, peafowl, wild duck, jackals, monkeys, wild boars and several varieties of deer abound in the forests of this region.

Passing the Duns and climbing the main range of the Himalayas there suddenly bursts upon our view a magnificent panorama of the foothills in the neighborhood of Mussoorie, one of the most picturesque and characteristic of the hill stations of India, situated at an altitude of about 6,000 feet. From here, or, better still, from the military camp at Landaur, near Mussooree, is obtained, perhaps, the finest view to be had in the whole sub-Himalayan range. Looking across the plain of the Ganges, are seen glimmering in the distance fine threads of silver, which mark the courses of the Jumna and Ganges rivers, while a little straight line, looking like a pin-scratch, represents the great Ganges Canal. Here and there the vast plain is dotted with groups of shining buildings, partly hidden in little clouds of smoke. In the opposite direction, far away in the distance over the intervening mass of forest-covered ridges, the summits of Kedarmath, Gangotri and neighboring peaks rise as mighty masses of whitest snow, towering to altitudes of 23,000 or 24,000 feet, nearly four miles vertically above the point of view. Should we journey by way of Chakrata, we see another pretty European village nestled among the hills and shaded by magnificent deodars (a variety of cedar), maples, chestnuts and oaks. Continuing our journey along the rambling hill roads which wind up the long slopes of the Himalayas, we cast a last look back on the pretty valley on the edges of which nestles Chakrata, and, bidding adieu to civilization, plunge into the fastnesses of the Himalayas. Our road here skirts the rocky cliffs, often built around the edge of such precipices as that on the Chakrata water road.

The few roads which lead through this region never attain to the dignity of wagon roads, but are yet better than the mountain trails of the United States. The grades are so steep and the curves so sharp that they can only be travelled on foot or horseback, and they rarely exceed six or eight feet in width. These trails are, however, well laid out by competent engineers, well-surfaced, and have on them numerous excellent bridges crossing gorges and ravines. The scenery along some of these roads is the finest of the kind in the world, the roads along the Rogi and Drali cliffs being cut out of sheer precipices of rock, which are several hundred feet almost vertically above the bottoms of the torrents, the cliffs continuing for some hundreds of feet above. At each bend in the road we obtain new views of the distant snowy range, as here we see Kedarmath Peak, 22,790 feet in altitude, nearly 20,000 feet above us, and now not forty miles away.

Beyond the hill stations the country rises steadily and rapidly, and the rivers flow in deep gorges, the beds of which are several thousand feet below the summits of the ridges. The slopes of the latter are clothed in dense forests of chestnuts, oaks and maples, firs, cedars and pines, while here the rhododendrons and holly attain a height of 60 feet. At the highest elevation at which vegetation is found, from 12,000 to 16,000 feet, birch and poplar are among the more common trees, and growing beneath these are gooseberry, currant and other bushes.

At Bharimghatti the cliffs are so rugged that our road leaves the river and crosses the gorge on a wire suspension bridge, 2 feet wide, 300 feet in length and 450 feet above the surface of the water. Here the river is a rushing torrent but a few feet in width and flowing between steep canyon walls. In the bottom of this narrow gorge occasional pretty little flats are found, any of which furnish excellent camping grounds. Some of these are permanently occupied by small settlements of the natives, hardy hillmen, who in their mode of living are not unlike the Highlanders of Scotland or the peasantry of the Alps. And now, as we enter the heart of the higher Himalayas, the canyon widens, its slope decreases, and it loses its torrential character until finally the Ganges becomes a good-sized river, wandering from wall to wall of the U-shaped valley, which, from its cross section, is evidently the result of glacial action. In the distance we get a nearer view of the snowy peaks, of which Srinkata, 22,700 feet in altitude, occupies the commanding position.

From here on for a few miles our path leaves the river valley, crossing a few low passes, from the summit of one of which, near Badrinath, we are suddenly confronted by an imposing wall of granite, Hoonooman Chutte, which is 22,000 feet in altitude. Here we pass ridges which are curiously faulted, inclined or folded, presenting such outcrops as would delight the heart of a geologist.

And now, as we approach the head-waters of the Ganges, we leave all vegetation behind. In places our path skirts the hillsides far above the stream, in others we are compelled to pick our way over glacial boulders, until at last we reach the final source of the Ganges at Gao-Mukh, the "Cow's Mouth," an ice cavern in which the Ganges heads at the terminus of Gangotri Glacier. The face of the glacier is 300 feet in height, and from this point a magnificent view is had of Gangotri Peak, 22,628 feet in altitude, over many miles of intervening glacier. Looking backward from Gao-Mukh down the Ganges, we see that we are now surrounded on all sides by barren rocks and masses of glacial drift.

In one place our path leads us by the Temple of Badrinath, in view of which is Badrinath Peak, at an altitude of 23,215 feet. This is the most sacred temple of the Hindu people, as the summit of Badrinath Peak is supposed to be the abode of Vishnu, and this is the highest shrine raised to that mighty deity. Skirting Gangotri Glacier near its summit, we obtain a magnificent view of the great masses of snow and ice which constitute Gangotri Peak. Leaving terra firma at this point, and crossing or skirting minor glaciers and snow-fields, we find ourselves encompassed by barren rock and ice until we finally lose all signs of road or trail, and crossing the great glacier by paths known only to our native guides, we ascend the slopes of Phung-Sing-Purbat, with the intention of taking a panoramic view of our surroundings before leaving forever this region of magnificent altitudes.

But let us pause a few moments to consider in detail the topography of this upper region. It consists of massive mountain ranges running in various directions, some northerly and southerly, others easterly and westerly, and dividing the head-waters of the Ganges, Sutlej and Chandra rivers, the latter being branches of the Indus. The heads of the valleys separating these higher mountain ridges are filled with glaciers which are of as great magnitude as they are numerous. The line of perpetual snow ranges between 13,000 and 16,000 feet along the southern chain of the Himalayas, and from 16,000 to 18,000 feet along the northern chain and in the northern Tibetan ranges. Nearly every high valley has its glacier, some of which are of large proportions. A few exceptional glaciers descend to elevations as low as 10,000 feet, the lowest of these being on the southern side of the Karakorum Mountains to the north of Kashmir. Of the large Himalayan glaciers, that of Gangotri is one of the greatest. This glacier has three branches which are respectively five, fourteen and fifteen miles in length. The Mana glacier, not far from this, is sixteen miles long, while numerous others in this portion of the Himalayan region are from seven to fifteen miles in length.

Returning to our point of view on the side of Phung-Sing-Purbat, we see to the west of us Gangotri Peak, 22,628 feet in height, and to the right of it Kedarmath, 22,790 feet. To the north is seen Hoonooman Chutte, 22,000 feet high, and to the right of it is Barrakoonta, 22,500 feet. To the east is Marapuit, 22,869 feet, and next to it is Badrinath, 23,215, while to the right of them we see Nunda Debi, 25,681 feet, an apparently low hill in the extreme distance. The hill on which we stand, Phung-Sing-Purbat, is 18,600 feet in altitude.

Leaving our point of view, let us pass over a portion of the intervening region to the Karakorum Mountains, which are north of the head-waters of the Indus River. As we traverse these, our way leads over great glaciers, the tributaries of which ramify in every direction as do those of a stream of water. Crossing Hispar Pass at an elevation of 17,650 feet, we obtain a magnificent view of the snow-clad summit of Gusherbrum Peak, 26,378 feet in altitude. Glorious as is this imposing peak, we gaze upon it with sentiments not unmixed with regret, for we are about to turn our steps homeward and leave forever this region of magnificent altitudes. The route which we have chosen takes us to the head-waters of the Sutlej River, a branch of the Indus. This we reach in Buspa Valley at the terminus of a great glacier, from a tunnel in which the Sutlej bursts in a torrent similar to that in which the Ganges heads in Gao-Mukh. Hastening on our return journey, we are greeted with other beautiful views, such as we saw in passing up the Ganges. As we plunge once more into the great forests, we cast a last farewell look upon the snow-clad summits which ever rear their mighty crests, cold and serene, amidst the solemn depths of highest unexplored Cloudland.

THE RECEPTION OF MR. PEARY.

A reception, offered to Civil Engineer R. E. Peary, U. S. N., on his return from the Arctic, by the American Museum of Natural History and the American Geographical Society, took place on the 14th of November, 1895, at the Hall of the Museum, and was very fully attended.

Mr. Morris K. Jesup, the President of the Museum, opened the meeting with the following address:

"LADIES AND GENTLEMEN: As President of the American Museum of Natural History, and representing its Board of Trustees, I bid you a cordial welcome this evening. We meet here to welcome one who has done so much in the cause of science and exploration, and whose courage, patience and endurance reflect credit upon the name 'America.'

"I shall not inflict a speech upon you this evening, but simply perform a pleasant duty, and introduce to you one whom we all love, and whose name is honored wherever known; I have the honor to present the Honorable Charles P. Daly, President of the American Geographical Society and ex-Chief Justice of the Court of Common Pleas."

Judge Daly, who was then invited to take the chair, briefly reviewed the career and the achievements of Mr. Peary as an Arctic explorer, who had not only extended our knowledge of Greenland and mapped parts of it previously unknown, but had also put in practice new and improved methods of Arctic travel and appreciably reduced the perils and uncertainties which beset the conduct of expeditions in the frozen North. How great these perils and uncertainties are and must always be sufficiently appears from the record of Mr. Peary's experience in the last two years when, as we all know, he and his brave companions had to struggle with storms of almost unexampled severity, and to draw back at last worn out by famine, when on the very threshold of success, defeated but not dishonoured. Well might such a leader adopt for his own the lofty words of the Roman:

'Tis not in mortals to command success,
But we'll do more, my comrades—we'll deserve it.

Judge Daly then introduced Mr. Peary, who spoke as follows:

MR. PRESIDENT, LADIES AND GENTLEMEN, MEMBERS OF THE AMERICAN MUSEUM AND OF THE AMERICAN GEOGRAPHICAL SOCIETY.

The present occasion is hardly an appropriate one for me to make any extended demand upon your time or attention, but it seems as if a few remarks might be entirely in order.

Five years ago, while urging before various Societies the advantages of a project for Arctic exploration, I advanced the following statements:

"FIRST.—Interest in Arctic work, discouraged by the sad disasters to the last two expeditions from this country, is at a very low ebb, yet needs only proper encouragement to turn it on the flood again.

SECOND.—Of all Arctic localities, Greenland, the pendant brooch in the glittering necklace of snow-capped lands which circle the North Pole, seems the most interesting. Hidden among its savage mountains lies the key to the secrets of those past glacial periods which helped to form the globe on which we live, and which, according to some scientists, were so stupendous as to even disturb the balance and affect the very revolution and axis of the earth itself.

To the explorer the indeterminate northern extension of Greenland and the unknown northeastern shore from Cape Bismarck to the farthest of Lockwood and Brainard are at once a promise and a reproach. Now that uncertainty as to the interior of Greenland has been cleared up by the journeys of Nordenskjöld, Nansen and myself, and it has been shown that that interior is a great unbroken plateau of snow, it offers an imperial highway to that unknown coastline.

THIRD.—The explorer must precede the savant, and break the trails and discover suitable localities for stations and investigations, in order to enable the latter to do his best work in the least time and at the least expense.

FOURTH.—Nearly all scientific material and collections from the Arctic regions have thus far been obtained by foreign scientists and institutions, and it is time that we on this side of the water should have our share of these treasures."

How has time dealt with these propositions?

Set in motion by my first expedition, the flood of interest in Arctic work has turned so strongly that within the past five years four Arctic voyages have been made, not including the five of my own ships; two expeditions are still in the field, and two or three others in the stage of promotion.

The northern extension of the mainland mass of Greenland has been determined and the advantages of the imperial highway of the interior shown conclusively. The completion of the gap in the northeast coastline remains yet to be accomplished.

The detailed knowledge of the Smith Sound region obtained by me has enabled me to point out to the botanist, biologist, geologist, and naturalist, the localities most suitable for their special lines of investigation, has permitted one of the first glacialists of the country to reap in a single season a harvest of information and original material in his special field, which had he gone blindly to the country he could not have obtained in two or three, and has more than doubled the amount of scientific material and information from the Arctic Regions in the Museums of this country.

As for my own work, for five years I have strained every energy and put every cent of money I possessed into it.

To say that my motives were entirely unselfish or that I was actuated solely by the love of science, would be incorrect, but I can say that the desire to win an honorable and lasting reputation went hand in hand with the desire to add to the sum of human knowledge. I felt that I saw something possible of accomplishment before me, and I could not rest until I had proved the truth or error of my belief.

The prime object which I saw before me was not the discovery of the North Pole, as many imagined, but the determination of the northern extension of Greenland and the delineation of its unknown northeastern coast. This is a work which President Clements Markham, of the Royal Geographical Society, in his annual address of last year pronounced one of the oldest and most interesting of Arctic problems. The discovery of the Pole itself was a secondary object and conditional upon the northern extension of Greenland or adjacent lands north of it.

The means of accomplishing these objects were somewhat in the nature of a new departure in Arctic work, namely, by overland, or more properly speaking, interior travelling, on a scale never before attempted.

Most of my hearers I assume to be familiar with the general features of my two last expeditions. A very brief résumé may, however, not be out of place. In the summer of 1891, after having passed the previous winter in Whale Sound, on the West Coast of Greenland, in latitude 77° 40 m. north, with a single companion I crossed the great interior Ice Cap of Greenland, and descended upon the northeastern coast at a point in latitude 81° 37 m. north, and longitude 34° 5 m. west, which I named Independence Bay. Having equipment fitted solely for inland ice work and provisions only for a limited time, I was unable to pursue my discoveries farther either to the southeast to connect with the surveys of the German expedition of 1869–70, or northward along the shores of the detached land masses which I saw stretching away to the northeastward. Returning over the Ice Cap to my headquarters and thence back to the United States in a steam whaler, I devoted the following winter and spring to raising the money for a second expedition to continue the work already begun. By the most strenuous efforts and with the assistance of my friends I was successful in accomplishing my object, and in the summer of 1892 sailed for Greenland again, with a larger party and a more extensive equipment, with the intention of again crossing the Ice Cap to Independence Bay and from there pushing on the explorations with two parties, one going north and northeast, as far as the land extended, the other east and southeast to connect with southern surveys on the east coast.

The start was made in the spring of 1893, but the severity of an exceptionally cold season, and the succession of violent storms upon the great Ice Cap destroyed my dogs, crippled my party, and compelled my return after having penetrated a distance of one hundred and twenty-four miles. Undiscouraged by these mishaps, I started again in the spring of 1894 with only two companions, Lee and Henson, and though but one of the caches of provisions which had been left by me upon the inland ice the previous year, caches which contained the most vital sledge supplies, could be found, the excessive snowfall of the previous year having submerged them completely, I still pushed on and with the utmost difficulty again reached Independence Bay. Loss of strength due to insufficient rations made it impossible for me to advance farther, and reluctantly I was compelled to return to my headquarters, without having advanced any considerable distance beyond my farthest of two years previous.

With my return from Greenland the past summer in a ship sent out by Mrs. Peary through the kindly assistance of the American Museum of Natural History, the American Geographical Society, and other friends, but particularly through the interest and generosity of the President of the former Institution, my audience is familiar.

That I am disappointed in not having accomplished all of my objects goes without saying. That I am shaken in my belief as to my methods and means does not at all follow. For four years I have kept the Stars and Stripes waving in the Arctic air, and it is through no fault of mine or of my methods that they have not gone farther north and accomplished more, but I am consoled by the thought that few men achieve complete success in any line in one or two or four or five years.

In exploration, as in business, as in letters, as in invention, conditions are entirely different now from what they were years ago. It is no longer possible for the confines of the well-known to be reached by a dash either mental or physical. The days when a Galileo or a Columbus could reach and pass beyond the narrow circumference of the world of mind or matter at any point are past. Whoever would now reach the distant horizon must select his course, pursue it as the crow flies, and consider himself fortunate if, at the end of years, he stands upon the coveted line looking into the unknown and still retains a fair reserve of his strength and energy.

Strange as it may seem to many, in view of the numerous Arctic expeditions that have gone out in the past, Arctic exploration thus far has, with perhaps two exceptions, been carried on in a haphazard desultory manner. Expeditions have been of two classes, Government and private. Let us consider the usual routine of one of the former.

Some scientist with powerful friends, or a coterie of Arctic authorities, advances a project for an expedition and urges it upon the Government. After a considerable time it is favorably considered and the money for it appropriated or granted by the proper authorities. The expedition goes into the field, and after the lapse of one or two or three years, returns. Perhaps returns in safety, but has accomplished little, at least has not in its results come up to public expectations, as was the case with the English expedition of 1875–76; or, it has accomplished much but at a fearful sacrifice, as was the case with our own Government expedition of 1881–82–83. In either event public condemnation and disapproval are the same, instantaneous and pronounced, the Government is averse to opposing this feeling by further efforts, and the matter ends. Ten or fifteen or twenty years later the same routine is again gone through with, but those who led the previous expedition are dead or too old to take the field again; their practical experience is forgotten, very likely an entirely new route or field of effort is selected, and everything must be learned over again.

How is it with purely private affairs, like my own expeditions, entirely without Government aid or responsibility? A young, eager scientist or enthusiast, like Dr. Nansen, for example, a believer in the possibility of accomplishing something in a certain way, devotes his own money or that of his friends, or both, to the work. As a rule an expedition fitted out under these circumstances is upon a comparatively small scale, and one voyage is apt to be its limit. For, though free from the effects of public disapproval, it is hampered by the limitations of usually not over plethoric private purses.

The two exceptions to the general rule to which I have referred above, are, FIRST, the systematic and sustained explorations carried on by the English Government during nearly a decade succeeding the loss of the Franklin Expedition. Among the results of these expeditions was the discovery of the northwest passage, the blank void on the charts of the Western Hemisphere north of North America was filled with new lands and seas, and form and shape were given to it as to the interior of Africa within the past decade, and the art of sledging upon the ice of the Arctic Ocean was brought to a state of perfection which has been but slightly excelled since.

SECOND.—The explorations carried on for the last twenty years or more by Baron Nordenskjöld, under the liberal patronage of Baron Dickson. This work being independent of popular approval or disapproval, ill success one year did not prevent its being prosecuted the next. And as a result the northeast passage was accomplished, important explorations were carried on in Greenland, Spitzbergen and other portions of the Arctic regions, and the Scandinavian Museums filled to overflowing with the scientific material and treasures of the Polar World.

Arctic exploration must, like anything else, be made a business, and carried on from year to year, profiting by each added item of experience, taking advantage of every occurring opportunity. That the prosecution of this business should be necessarily expensive, does not by any means follow. On the contrary, my work has shown that it can be prosecuted for a very moderate sum. The amount of money, from $50,000 to $100,000, necessary to fit out an expedition according to the old régime, would now on the plan shown feasible by myself carry on sustained and systematic explorations for five or ten years. In other words, such sustained and systematic exploration as alone can achieve the fullest success, I have shown to be within the means of a single institution of any magnitude or even of a private individual.

Should an American Baron Dickson or Mr. Harmsworth, a second Henry Grinnell, or any one of our wealthy Societies or Institutions take sufficient interest in this work to devote $10,000 per year for ten years to it, the end of that time would, I believe, see every gap in the Arctic map of the Western Hemisphere filled up to and perhaps beyond the 85th parallel, and the Museums of this country richer in Arctic collections than the Old World Museums of London, Copenhagen and Berlin.

My personal efforts for the past four years and my personal fortune are a contribution to the great cause, and have, I believe, opened the door and shown the way to a more fortunate successor. The experience of the past four years has demonstrated the economical basis upon which Arctic explorations can be carried on, and has brought the art of inland ice travel from the state of experiment to the same stage of perfection that the art of sea-ice sledging had attained at the close of the series of expeditions in search of the Franklin party. The command of the unknown East Greenland coast is to-day in the possession of the explorer following my lines of work, at a moderate cost and a minimum expenditure of time, and the same methods offer the simplest means of solving the interesting Ellesmere Land problem by an overland journey.

There is another phase of my work which has a deeply human interest, and that is its connection with and effect upon a very small but extremely interesting tribe, or perhaps I might more properly say, family, of the human race, a little community of aboriginal hyperboreans, the most northerly individuals of the human race, numbering but 257, completely isolated from all the rest of mankind by impassable icy barriers, yet living on, free, happy and independent, from year to year through the long summer day and the great Arctic night. As I stand here talking to you now, I can see them, already within the shadow of the great night, the sun having left them three weeks ago, comfortable and contented in their little stone houses perched upon the shores and bluffs of the frozen Arctic Ocean, with the light from their oil lamps shining softly through the translucent membranes of their windows out into the icy blackness of the night.

The effect of my expeditions upon those children of the North has been to raise the entire tribe to a condition of affluence. The difference between their condition five years ago and to-day can perhaps be best illustrated by asking you to imagine the case of a community or village of farm or day laborers, working at a dollar and a quarter a day and possessing nothing but their wages, and that each member of this community should have given him a furnished house and lot and a ten thousand dollar bank account. Five years ago many a man in the tribe possessed no knife and many a woman no needle, and so great was their desire for these priceless treasures that on one occasion a man offered me his wife and children for a twenty-five cent pocket-knife.

Few of the men possessed kayaks or skin canoes, and he was indeed well off who had a spear or harpoon shaft made of a single piece of wood. To-day, men and women are amply supplied with knives and needles; every adult man and half-grown boy has his canoe, most of the men have guns and every hunter is supplied with the best of wood for his lance, his harpoon, his seal spear and his sledge. The effect of these improvements in their weapons has shown itself at once in the improved condition of the tribe, resulting from the great increase in the effectiveness of the hunters. The people are better clothed, they can support a larger number of dogs (their only domestic animal), and as a result of their more ample nourishment and consequent greater ability to withstand the constant hardships of their life, the death rate has decreased and the birth rate perceptibly increased within the past five years.

My experience of the past two years has strongly accentuated my previous belief in small parties for Arctic work. The history of Arctic explorations sustains me in this belief. The results obtained by Graah, Greely, Schwatka, Hall, Rae, and others, were obtained by parties of two or three. Many of the sad disasters which form a part of Arctic history would have been avoided had the parties been small. It is a popular fallacy that there is safety in large parties. The entire animus of the Arctic region is against such parties, and in the event of their being thrown, either temporarily or permanently, upon the resources of the country for sustenance, an occurrence that is one of the most certain of Arctic possibilities, the members of such large parties will starve, where a small party would have abundant rations. A coward, a weakling, or an insubordinate man has better opportunity to cause demoralization in a large than in a small party.

In the Franklin expedition, out of a party of 138, not one lived to tell the story of their terrible final days, and I have no doubt that the utter loss of that expedition was due directly to its size. As long as everything goes well, a large party may be all right, but in the hour of disaster or serious disappointment, the trouble begins. Nothing can be more terrible than the retreat and struggle for life of a large party under the fearful stress of the Arctic. It is impossible for a leader, no matter what his qualities, to fill a large party as he can a small one with his own courage and hopefulness. Every individual in the party represents a drain upon the vital magnetism and force of the leader, upon whom the safety of the party depends. Up to a certain point his example is contagious and his cheerfulness, activity and courage are reflected in every member of the party, but when day after day of arduous struggle, of cold, of hunger, and discouragement, have reduced the powers, both physical and mental, the infusion of fresh courage into a desponding one requires as tangible a transfer of the leader's stamina and nerve force, as the filling of a vessel with water from a reservoir, and the reservoir in this case does not refill as rapidly as under normal conditions.

A word or two in regard to the various projects of Arctic work now attracting attention. The English Jackson-Harmsworth expedition which, at last accounts, was safely located at its base of operations in Franz Josef Land with its advance depots well under way, seems most promising. Granted the extension of the Franz Josef archipelago well to the north and barring unforeseen accidents, which are those that usually occur in Arctic work, Mr. Jackson certainly seems in a very auspicious position to far outstrip previous records in the high north. As to Dr. Nansen's expedition, if the recent reports that a vessel, supposed to be the *Fram*, has been seen in the ice off the east Greenland coast, are true, we shall probably hear from him soon. If in the time since his departure, his ship has really drifted to the vicinity of the Pole, he certainly has been most exceptionally fortunate. I have always believed that Dr. Nansen and his party would return from their voyage, hazardous as it seems, but I have always felt that if they returned with their ship, it would be only by the most gracious permission and concurrence of the Arctic ice and the weather demon.

As for the project of Andree, who proposes to reach the Pole by means of a balloon, I can only say that I should personally prefer to wait until the science of aeronautics has been reduced to that exactitude which will permit a man to put on his wings with the same facility and effectiveness that we now don our overshoes or coat. I say this in no derogatory spirit, for I believe we shall ultimately attain to something akin to this, but before that time arrives I believe that the North Pole will be reached by some of the at present recognized methods of locomotion, and if not attained by either of the expeditions now in the field, I believe it will be reached by an American.

The two great popular objections to Arctic exploration seem to be the waste of money connected with it and the supposedly excessive loss of life. It would seem from the emphatic utterances of some who decry what they consider a waste of money on Arctic work, that they are under the impression that the money expended upon an Arctic expedition is taken north and buried in the snow, becoming an absolute and total loss. It seems to be forgotten that the supplies and equipments of these expeditions are purchased and paid for at home and that they contribute to the support of a certain number of people for a certain time as much as if those people were living at home.

The other objection, that Arctic work means too great a sacrifice of life, loses its force in the light of actual facts. To those familiar with the literature of Arctic exploration it is a well-known fact that the loss of life in this field, even including those expeditions which have disappeared utterly and completely in the savage fastnesses of the White North, amounts to but two per cent. of the total number engaged in the work, a percentage less than that of the annual loss of life among the fishermen and sailors along the shores of the British Isles.

During my own work of the past four years but one life has been lost, and that was the result of an accident in no way connected with the work itself, an accident which would have been likely to occur in the Alps or in any of our own wild mountainous districts.

To those who in the absence of a dollar for dollar return for every effort, ask "Of what earthly use is Arctic exploration?" I might ask "What is the use of yacht races, of international athletic contests, of trials of engines and warships, or any of the innumerable tests that have since the world was young been man's only means of determining the superiority of one man or one machine, or one method, or one nation over another?"

Were I asked to enumerate all the possible advantages of Arctic explorations, I should say frankly I cannot do so any more than I or any one could have said fifteen or twenty years ago that an insignificant grass growing on the banks of a tropical river would make our incandescent electric light a possibility.

Would it be at all strange in a region of the strongest contrasts, where active volcanoes are found surrounded by eternal snow and ice, and where the poppy, symbol of warmth and sleep and luxury, blossoms at the very foot of the icy crags of glaciers, if some material were found which alone would make possible some yet unknown necessity of our future civilization?

However, a question which claimed the lives of such men as Kane, Hall, De Long, Chipp, and Lockwood, of our own countrymen, and Franklin, Bellot, Crozier and many more from across the water, and has inspired the pens of Markham, Petermann, Barrow, Greely, and others, needs no apologies.

There is no page of England's history on which she prides herself more than that on which are inscribed the work and the discoveries of her sons within the realm of Noonday Night, and Midnight Sun, and there is no true American that is not proud of the records of Kane, De Haven, Hayes, Hall, De Long, Melville, Greely, Lockwood, and Schley. The very fact that there is no possibility of sordid motives of gain or conquest, makes this field doubly attractive to noble minds.

Whatever may be said against Arctic exploration, it remains a definite fact that no other portion of the globe possesses such universal attraction for young and old, intelligent and illiterate, weak and strong, as this. And one thing is as certain as that the North Star will continue to shine, regardless of utility or non-utility, the inherent charm of Arctic work and the irrepressible restlessness of the human animal, as long as there remains a corner of the earth unknown to him, will keep up the interest and spur effort in the White North, and maintain it as a field of the highest national as well as individual rivalry, till every square mile of sea and land has been charted.

As to the comment which has been made that my lack of full success during the past year has set the cause of Arctic exploration back indefinitely, did I believe this to be true I should feel the deepest regret; but I do not believe it. On the contrary, I believe I am justified in feeling that it has strengthened interest in that it has shown what can be done even under the most unfavorable circumstances. I believe there never was a time when there was a wider spread or more favorable interest in Arctic explorations than to-day. The reputable press throughout the country, almost without exception, voice this interest and approval, and where they do not it is in most instances the result of a misconception of facts.

Should that Englishman now up in Franz Josef Land outstrip the record which the Stars and Stripes for the past twelve years has held through the courage and energy of Lockwood and Brainard, of General Greely's party, and carry the dragon of St. George farther to the north, I do not believe it would require six months to obtain the necessary sinews of war to start the fairest flag the sun shines on north again to regain its place in the lead.

In conclusion, a word of acknowledgment to my friends. Never was a man more fortunate in these than I. It would be impossible to enumerate them all, but the Philadelphia Academy of Natural Sciences, the American Geographical Society, the Geographical Club, of Philadelphia, the American Museum of Natural History, and the names of Judge Daly, of General Wistar, of Adams, Bridgeman, Heilprin, Melville, Putnam, and Hurlbut, will not be forgotten.

But there is one who has touched me in a tenderer spot than any other, the one who smoothed the way for the brave woman who bears my name, and last spring, when things looked darkest in her efforts to send a ship for me and my two companions, relieved her intense anxiety by saying: "Give yourself no further uneasiness. I will stand in the gap with whatever amount may be needed to send the ship." The expenses of a voyage to Northern waters can only by the most rigid economy be brought below $10,000. And in spite of the generosity and assistance of the American Museum, the American Geographical Society, and other friends, as a matter of fact more than one-half the costs of the voyage were borne by this one.

The princely giver to whom I refer is Morris K. Jesup, President of the American Museum of Natural History, the man who during the fifteen years that he has been its head, has made the Museum what it is to-day, the pride of every New Yorker, and is still urging it upward and forward at the constantly accelerating speed that alone can enable it to keep pace with the first city of the Occidental Hemisphere.

WASHINGTON LETTER.

WASHINGTON, DEC. 20, 1895.

For the first time in the history of the Geological Survey, the annual report of the Director is submitted and printed to date. Always the most attractive of the Governmental reports, it is this year more so, on account of the information it has of the latest results of the important interests under its control.

Speaking more directly of its geographic work during 1895, it is to be noted that $159,200 was allotted to topography. Of this amount it was provided by law that $35,000 should be expended west of the 97th meridian, and one-third of the remainder west of the 103d meridian. The proportion allotted to New York was $10,000, to Georgia, South Dakota, Nebraska and Oregon the same, to California and Colorado $20,000 each, to Texas $12,000, and to eleven other States smaller sums.

This being the first report of Charles D. Walcott, the successor of Maj. John W. Powell, who successfully organized and for fourteen years directed the large and highly important operations of the Survey, it is gratifying to know that the new Director did not find it desirable to make any radical changes either in the policy or personnel of the administration. The changes made have been in the nature of readjustments intended to meet new conditions. These readjustments, briefly outlined, are: the raising of the standard of quality of the topographic map; the representation on all maps hereafter surveyed in the public-land States, of the land-subdivision lines, and, when possible, the location of the position of township and section corners, and the determination of their altitude; the enlargement of the work of resurvey of areas, the existing maps of which are, from any cause, defective or inadequate for the proper representation of the areal and economic geology; the planning of a system of triangulation to supplement that already done by the Coast and Geodetic Survey and by the Geological Survey.

The topographic branch of the Survey has two divisions, viz., Triangulation and Topography. The latter division made surveys during the season of 1894–95 in twenty-one States, viz.:

STATE.	SCALE OF PUBLICATION.		CONTOUR INTERVAL.
	1:62500	1:125000	
	SQUARE MILES.	SQUARE MILES.	FEET.
Maine	500	..	20
Vermont	750	..	20
New York	750	..	20
Pennsylvania and New Jersey	1,000	..	20
West Virginia and Maryland	..	1,500	100
Virginia	..	500	100
Tennessee	..	500	100
Georgia	..	1,500	50
Minnesota	500	..	20
North Dakota	..	2,000	20
South Dakota	..	2,225	20
Wyoming	..	1,000	50
Nebraska	250	4,500	20
Colorado	*575	*3,000	50 and 100
Texas	..	2,350	20 and 100
Idaho	..	2,000	100
Washington	300	..	25
Oregon	..	1,000	100
California	3,175	500	25 and 100
Total	7,800	22,575	..

* Besides 38 square miles mapped on scale of 1 : 25000.

The following topographic sheets were completed during 1894–1895:

LOCALITY AND NAME OF SHEET.	SCALE.	CONTOUR INTERVAL.
		Feet.
MAINE:		
Sebago Lake	1:62500	20
Bridgton	1:62500	20
VERMONT:		
Strafford	1:62500	20
Pawlet	1:62500	20
Manchester	1:62500	20
NEW YORK:		
Ticonderoga	1:62500	20
Hoosick	1:62500	20
Fonda (part in 1893)	1:62500	20
Lake Placid (part in 1893)	1:62500	20
Ontario Beach	1:62500	20
PENNSYLVANIA:		
Norristown	1:62500	20
Chester	1:62500	20
Philadelphia (revision)	1:62500	20
Germantown (revision)	1:62500	20
MARYLAND and WEST VIRGINIA:		
Piedmont (revision)	1:125000	100

LOCALITY AND NAME OF SHEET.	SCALE.	CONTOUR INTERVAL.
		Feet.
GEORGIA:		
Monroe	1:125000	50
MINNESOTA:		
St. Paul	1:62500	20
Minneapolis	1:62500	20
NORTH DAKOTA:		
Valley City	1:125000	20
SOUTH DAKOTA:		
Huron	1:125000	20
WYOMING:		
Sundance	1:125000	50
NEBRASKA:		
Lincoln	1:62500	20
Hebron	1:125000	20
York	1:125000	20
Superior	1:125000	20
Grand Island	1:125000	20
COLORADO:		
Cripple Creek	1:25000	50
Telluride	1:62500	100
Rico	1:62500	100
Pueblo (revision)	1:125000	50
Walsenburg (revision)	1:125000	50
Nepesta (revision)	1:125000	50
TEXAS:		
Valentine	1:125000	100
Fort Davis	1:125000	100
IDAHO:		
Weiser	1:125000	100
CALIFORNIA:		
Yosemite (part revision)	1:125000	100
Los Angeles (revision)	1:62500	25
Pasadena	1:62500	25
Santa Ana	1:62500	25
Downey	1:62500	25
San Francisco	1:62500	25
Cucamonga	1:62500	25
Pomona	1:62500	25
Redondo	1:62500	25
Las Bolsas	1:62500	25
San Mateo	1:62500	25
San Bernardino	1:62500	25
Anaheim	1:62500	25
San Pedro	1:62500	25

Formerly the manuscript maps, as prepared by the Topographic Branch, were approved and sent to the engraver without special editorial examination or revision. These manuscripts, produced by many men working independently, were unequal in character and quality, and it has been decided to refer to an editor of topographic maps every topographic manuscript submitted for publication. Mr. Marcus Baker, who has served continuously as Secretary of the United States Board on Geographic Names, has been assigned to this position. The work is made to cover not only new maps, but all the old ones when a revision is to be made for the purpose of printing a new edition, or when any sheet is to be prepared for use as a topographic base for the maps of one of the Geologic Folios. But few of the 900 topographic atlas sheets engraved have had the form or application of the geographic names upon them authoritatively established.

In the matter of the survey and subdivision of the lands in the Indian Territory authorized by the last Congress, the subdivision has not gone on as rapidly as was anticipated, owing to a mistaken idea regarding the character of the country. It was assumed that it was mainly an open country, in which subdivision could be carried on rapidly. As a matter of fact, three-fourths of it are heavily timbered, and not less than one-fourth is mountainous. The timber and undergrowth are commonly so dense as to require continuous chopping in order to open the lines, so that the rate of progress depends upon the rate at which the lines can be chopped out. The open country which is found in the central part of the Cherokee Nation has not yet been reached. In this the work will progress far more rapidly than elsewhere. While the survey and subdivision of this Territory is going on, an accurate topographic map of the country is also being prepared.

For several years the Division of Topography has been engaged in compiling a list of positions determined within the United States which are believed to be of sufficient accuracy for use in the preparation of its maps. As a method of making the compilation of public use, it has been issued as a Bulletin of the Survey, under the title of "A Dictionary of Geographic Positions in the United States. By Henry Gannett." The list comprises between 9,000 and 10,000 positions by latitude and longitude, with abbreviations indicating the authority, and references to the publications in which other data relating to the positions may be found. Ninety-nine per cent. of all the determinations have been made by the Coast Survey, the Geological, Lake, Hayden, Powell, Wheeler, and New York State Surveys, and Mississippi and Missouri River Commissions.

Mr. Gannett describes the work of each of these nine organizations, the parts of the country in which their work has been done, its extent, and the methods employed both in field and office, and characterizes the degree of accuracy which may be expected in their determinations.

An important question has been reconsidered and determined relating to the scale of publication of maps in the Geologic Atlas in the case of States, which like Maryland and those of New

England, have been surveyed on a scale of one mile to the inch. It having been shown that there can be much speedier publication and no corresponding loss of scientific or educational value in publishing on a scale of two miles to the inch, this scale has been adopted for the Geologic Atlas, except in special cases.

Following is a tabulated statement of the present condition of publication of the Geologic Atlas:

GEOLOGIC FOLIOS READY FOR DISTRIBUTION.

NO.	NAME OF SHEET.	STATE.	LIMITING MERIDIANS.	LIMITING PARALLELS.	AREA IN SQUARE MILES.	PRICE IN CENTS.
1	Livingston	Montana	110°–111°	45°–46°	3,354	25
2	Ringgold	Georgia Tennessee	85°–85° 30′	34° 30′–35°	980	25
3	Placerville	California	120° 30′–121′	38° 30′–39°	932	25
4	Kingston	Tennessee	84° 30′–85°	35° 30′–36°	969	25
5	Sacramento	California	121°–121° 30′	38° 30′–39°	932	25
6	Chattanooga	Tennessee	85°–85° 30′	35°–35° 30′	975	25
7	Pike's Peak	Colorado	105°–105° 30′	38° 30′–39°	932	25
8	Sewanee	Tennessee	85° 30′–86°	35°–35° 30′	975	25
9	Anthracite—Crested Butte	Colorado	106° 45′–107° 15′	38° 45′–39°	465	50
10	Harper's Ferry	Virginia W. Virginia Maryland	77° 30′–78°	39°–39° 30′	925	25
11	Jackson	California	120° 30′–121°	38°–38° 30′	938	25
12	Estillville	Virginia Kentucky Tennessee	82° 30′–83°	36° 30′–37°	957	25
13	Fredericksburg	Maryland Virginia	77°–77° 30′	38°–38° 30′	938	25
14	Staunton	Virginia W. Virginia	79°–79° 30′	38°–38° 30′	938	25

GEOLOGIC FOLIOS IN PRESS.

NO.	NAME OF SHEET.	STATE.	LIMITING MERIDIANS.	LIMITING PARALLELS.	AREA IN SQUARE MILES.	PRICE IN CENTS.
15	Lassen Peak	California	121°–122°	40°–41°	..	..
16	Knoxville	Tennessee N. Carolina	83° 30′–84°	35° 30′–36°	..	..
17	Marysville	California	121° 30′–122°	39°–39° 30′	..	..
18	Smartsville	do	121°–121° 30′	39°–39° 30′	..	..
19	Stevenson	Alabama Georgia Tennessee	85° 30′–86°	34° 30′–35°	..	..
20	Cleveland	Tennessee	84° 30′–85°	35°–35° 30′	..	..

There is in course of printing, also, a special map of the Cripple Creek mining district of Colorado, which will form a part of the Pike's Peak folio, mentioned above.

The Hydrographic Division of the Survey, Mr. F. H. Newell in charge, has been engaged in the study of water supply and in the measurement of the volume of water in various streams, mainly in the western part of the country. A Bulletin recently issued details the earlier investigations of the Division in the western interior, and Potomac basins; also a list of discharge measurements of various streams in the United States.

The press of the Geological Survey has been one of considerable activity during the sixteen years of its existence, as evinced by its "List of Publications," recently issued. It counts, 16 Annual Reports in 26 large 8vo vols.; 24 quarto volumes of Monographs; 130 Bulletins; 10 volumes of Statistical Papers; about 900 atlas sheets, and 28 special maps; an aggregate of 1018 publications, or about 63 in a year.

BIOLOGICAL MAP.—The biological map of North America on a large scale which has occupied the attention of the Department of Agriculture for a few years past now covers, as far as preliminary work is concerned, the greater part of the United States, except eastern Oregon, north and central Nevada, parts of New Mexico and Texas, and some of the Eastern States. In addition, a detailed survey has been made, with a degree of accuracy equal to or exceeding that of the best topographic maps available, of large parts of California, western Oregon and Washington, Idaho, Montana, Wyoming, South Dakota, Utah, Arizona, and a number of the Southern States. This map when completed will show the boundaries of life areas; thus saving large sums of money now expended annually in futile efforts to make crops grow in places climatically unsuited to their needs. They will also be useful in indicating the areas subject to and those exempt from the ravages of destructive insects and other pests, and also those in which certain diseases of plants and animals are likely to flourish. Congress authorized this comprehensive investigation of the geographic distribution of animals and plants in 1890; thus in effect establishing a new survey—a Biological Survey—of the country.

The northern boundary of both arid and humid divisions of what is known as the Austral zone (which covers the southern tier of States and much of California) has been followed completely across the continent. This zone is considered of the greatest importance because of the large number of valuable crops that grow within it.

The preparation of this very practical map is in charge of the Division of Economic Ornithology and Mammalogy of the Department of Agriculture; of which Dr. C. Hart Merriam is the Chief. Secretary Morton says the name of this Division is unfortunate, as it conveys an erroneous idea of the nature of its work.

A national map on a large scale, to show all the macadamized and gravel roads in the United States, is another new undertaking of the Department of Agriculture. Upon this map new roads are laid down as fast as built. The maps of Pennsylvania, Indiana and New Jersey are already sufficiently advanced to present most interesting facts, and those of other States are progressing.

ALASKA.—The Governor of Alaska, in his Report to the Secretary of the Interior, 1895, gives an interesting account of his travels, 2,000 miles more or less, westward from Sitka, within the bounds of Alaska. He visited Kadiak, Wood Island, Karluk, Sand Point, Unga, Belkovski and Unalaska.

At Kadiak are now located a deputy Collector of Customs, a U. S. Commissioner, a deputy Marshal, and a good school. At Wood Island (village) are two churches and a school, but only 150 people. At Karluk are about 600 people in the fishing season. There are four large canneries and a school house. The Governor says a Justice of the Peace and a constable would be useful here. At Belkovski are a school house, church and 190 people. Sand Point has a Custom-house, store and warehouse. The deputy Collector, his wife, the storekeeper, and three Russian families make up the town. Unga has a church and school, and 200 people. Unalaska has a deputy Collector, a Commissioner, a deputy Marshal, three school houses, a church and 300 inhabitants. It is the headquarters for whalers and Government vessels; also the central point of the Alaska Commercial Company. The Island of St. George has a population of about 100, and St. Paul double that number. The annual census for the past six years shows a gradual increase. On each island there is a church and a school house. Population, church and school house would probably all disappear with the extinction of the seal fisheries.

The amount of gold produced from the mines of Alaska during the past year has done much to confirm the opinion that this territory will be a permanent mining country. There are indications that the valley of the Yukon River is the most extensive field of placer mines discovered since the finding of gold in California. It is estimated that there are about 1,500 miners living in that part of Alaska. The miners are about 1,000 miles from Sitka.

It is not generally known that there is located at Sitka a society having for its object the collection and preservation of specimens illustrative of the natural history and ethnology of Alaska, and publications relating thereto. It has gathered curios and skins, specimens of Indian and Eskimo handiwork, and all sorts of ivory carvings from every part of the Territory. Dr. Sheldon Jackson has furnished the Society with a commodious fire-proof building.

The Commissioner of the General Land Office reports that he has passed upon 101 surveys of public lands in Alaska. There is no Surveyor-General of public lands in this Territory, the functions of that officer devolving upon the U. S. Marshal, without compensation. The results of an investigation by a Government inspector reveal a remarkably alarming condition of methods in conducting public business, for which the present official, however, should not be held responsible.

Mr. Marcus Baker, in a recent address, called attention to the marked deflection of the Alaska boundary line on Canadian maps since 1884. In that year an official map showed the boundary as passing up Behm Canal, an arm of the sea some 60 or 70 miles west of Portland Canal. Another Canadian map three years later carries the line across the head of Lynn Canal in such a manner as to throw its headwaters into British territory. Still later Canadian maps carry the line not across the head of the canal, but near its mouth, some 60 or 70 miles south of the former line.

The Superintendent of the Coast Survey has asked Congress for an additional appropriation of $50,000 for the purpose of running definite lines of demarcation on the Upper Yukon and its tributaries, and to provide for the contingency of surveys which may be required along the boundary in unforeseen localities. The Secretary of State in forwarding the estimate remarks that "The determination and marking of the 141st meridian in that part which by treaty forms the boundary between Alaska and British Columbia is not provided for by any existing treaty, and negotiations to that end may probably be begun in the near future."

Coast Survey.—Tide Tables for the Atlantic and Pacific coast, heretofore issued separately by the Coast Survey, are now consolidated, and extend to the world at large. In the volume for 1896, recently issued, the predicted time and height of every high and every low water throughout the year are given for seventy principal ports or stations. These predictions are extended to about three thousand subordinate stations by means of tidal differences and ratios.

The Coast Survey has completed the triangulation along the line of the 39th parallel from the Atlantic to the Pacific Ocean. This means a great deal to astronomers and geographers.

HYDROGRAPHIC OFFICE.—The expansion of the work of the U. S. Hydrographic Office is mainly on the Great Lakes and Pacific Ocean. The character of the work in the first named direction has caused it to meet with general approval. The policy of the office, says Capt. Sigsbee, is to shape its work and publications so strictly to nautical needs as to avoid, as far as possible, duplicating the work already well done by other branches of the Government. It is remarkable that the immense commercial interests of the Great Lakes had not sooner received benefits similar to those conferred by the Government on the commerce of the seas. A Pilot Chart (similar in scope to the North Atlantic and North Pacific Pilot Charts), Sailing Directions, Sailing Charts, and Notices to Mariners for the Great Lakes, have been issued for the first time during the past year.

A trial issue of the Pilot Chart of the North Pacific was made in January, 1894. Its issue as a permanent publication was authorized by Congress in the same year. The first regular issue was in July. August was omitted, but since that time it has regularly appeared. It may be long before it reaches the plane occupied by the North Atlantic Chart; but this condition is due entirely to the lack of observers cruising in the Pacific.

The Hydrographic Office desires to construct trustworthy charts of the north coast of South America, where the interests of United States commerce are increasing. The stretch of coast lying to the westward of the mouth of the Orinoco River, which is unsurveyed and about which little is known, is more than 500 miles in length.

UTAH.—The forty-fifth State comes into the Union with a population of 247,324,—less than that of the District of Columbia, or of Oklahoma, but many times larger than that of Nevada.

The latest official accounts from the Territory presents satisfactory conditions of industrial resources and a somewhat phenomenal development of commercial interests. All the Federal officials agree in the opinion that polygamy is dead beyond the possibility of even an attempted resurrection.

NEW MEXICO.—W. T. Thornton, Governor of this Territory, claims, in his late Report to the Secretary of the Interior, that there is no portion of the Union possessing such splendid climatic conditions as exist in that Territory. No extremes of heat or cold, with clear, bright skies. He quotes the following records from the U. S. Weather Office at Santa Fé:

	1892.	1893.	1894.
Average temperature, degrees	49.1	49.4	48.9
Maximum temperature, "	90.	89.	86.
Minimum temperature, "	1.	5.	0.
Average relative humidity, per cent.	43.	38.	41.
Total rainfall, inches	11.62	14.94	13.31
Number of cloudless days	248.	235.	213.

NOTES.—"Highways of Commerce," is the title of the State Department Guide Book which will supply to merchants, travellers and students authentic information concerning the great highways of traffic and travel in foreign countries. It is a valuable compilation. No traffic line is mentioned unless it carries passengers, through mails or freight in considerable quantities ; nor are subsidiary or military lines discussed.

There is a vast amount of information in this 800-page volume. Without being confronted with weary pages of statistical tables, the reader will find, under the name of any country on the globe, a concise account of its railway, navigable water-way, and highway facilities ; rates of fare and freight ; and numerous maps of railway, steamship, and river routes.

In the apportionment of railway lines by continents, America occupies the first rank, having 31,394½ miles more than the remainder of the world. The average cost of European lines has been $121,260.88 per mile ; in the United States, $59,298.12. The cheapest railways are in Australia, where, in the western portion, the price has been as low as $21,723 per mile.

Under legislation of the last Congress, all military records, such as muster and pay rolls, orders, and reports relating to the personnel or the operations of the armies of the Revolutionary War and of the War of 1812 have been transferred to the War Department to be preserved, indexed, and prepared for publication. A large mass has been so transferred and the records relating to the personnel of the Revolutionary War have been indexed and arranged for use. The recent revival of interest in matters pertaining to the Revolution, due largely to the efforts of the various patriotic societies, has given rise to a steadily increasing demand for information from the military records of that war. The Department is now answering promptly all inquiries relative to officers and enlisted men, and is furnishing so much of the military history of those whose names are borne on the rolls as is afforded by the rolls themselves.

It is estimated that there is enough original manuscript selected from the naval records of the Civil War to make between 20 and 30 volumes. Volume 2 has appeared, and two more volumes are expected soon. The demand for this publication has been large. The reports of Union commanders are full and fairly complete. The Confederate records are not equally complete, due to the great difficulty found in collecting them, and also to the fact that a large part of the archives of the Confederate Navy Department was burned at the close of the war.

The concluding volumes of the first Series of the Records of the Union and Confederate armies are nearly in type. The second Series, relating to prisoners of war, has been begun, and the first volume well advanced in printing.

H.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

THE GREATEST DEPTH OF THE OCEAN.—Adm. W. J. L. Wharton, R. N., sends the following letter to *Nature*, of October 3:

> A deeper spot in the ocean than any yet known has been recently found by H. M. surveying ship *Penguin*. Unfortunately the observation was not complete, as a fault in the wire caused it to break when 4,900 fathoms had run out without bottom having been reached.
>
> Commander Balfour reports that this occurred in lat. 23° 40′ S., long. 175° 10′ W., about 60 miles north of a sounding of 4,428 fathoms obtained by Capt. Aldrich in 1888. A previous attempt to reach bottom had been foiled by a similar accident to the wire when 4,300 fathoms had passed out, and the rising wind and sea prevented any further attempt at the time. As the deepest cast hitherto obtained is one of 4,655 fathoms near Japan, it is at any rate certain that the depth at the position named is at least 245 fathoms greater.
>
> It is hoped that before long a more successful attempt to find the actual depth will be made.

The sounding of 4,655 fathoms was made in the *Tuscarora* in 1874, by Commander, now Rear-Admiral, Belknap, U. S. N., who expressed himself as follows, in a letter written to the New York *Sun*, from Brookline, Mass., under date of November 18, 1895:

> Referring to the brief mention in the *Sun* of the 15th inst. of the deep-sea sounding made by Commander Balfour of H. B. M. S. *Penguin*, in that region of the South Pacific a little south of the Tonga, or Friendly Islands, let me say that in so far as I have been able to gather the facts of that sounding, the actual depth was not determined at all. The wire broke when 4,900 fathoms had run out without giving any sign of the sinker having touched bottom. In a previous attempt of the *Penguin* in that locality, the wire had broken when 4,300 fathoms had run off the drum. The brief report of those soundings, printed in *Nature*, gives no hint as to whether the undercurrents of the ocean entered in any way into the incidents of those deep casts, though mention is made of strong wind and considerable sea.
>
> The *Tuscarora*, when sounding off the east coast of Japan in 1874, and at a distance of about 100 miles from the land, had the wire break when 4,643 fathoms had run out. In that case the current of the Black Stream of Japan swept the wire from the perpendicular and, by the stress of its flow, not only prevented a correct sounding, but caused the wire to part.
>
> No further effort was made to get at the depth in that locality, for there was neither time nor wire to spare for that purpose; nor was it believed that a submarine cable could be successfully laid in such deep water swept by so strong a current.
>
> In the *Tuscarora's* experience the ocean undercurrents played strange freaks now and then with the wire. The trend of the wire would change in direction, and some-

times a movement would be observed, as though a big fish had seized the sinker in his mouth and was swimming off with it.

The scene of the recent deep-sea soundings of the *Penguin*—the deep submarine valley in the neighborhood of the Friendly and Cook Islands, which would seem to be as remarkable as the great depression of the ocean bed discovered by the *Tuscarora* off the east coast of Japan in 1874—was first indicated by H. B. M. S. *Egeria*, Capt. Pelham Aldrich, R. N., in 1888, when several soundings in depths of over 4,000 fathoms were made, the deepest being in 4,428 fathoms. The next year, 1889, Commander C. F. Oldham, R. N., who had relieved Capt. Aldrich in command of the *Egeria*, had the good fortune to find still deeper water, a depth of 4,530 fathoms, in that region of ocean.

It is a notable fact that the *Challenger*, in her tracks in the South Pacific on her famous expedition round the world, 1872–76, just missed the great trough developed by the work of the *Egeria* and *Penguin*. Indeed, up to the date of the *Egeria's* work in the South Pacific the greatest depth found south of the equator, either in the Atlantic or the Pacific, had been sounded by the U. S. S. *Alaska*, Capt. Belknap, in July, 1881, about 100 miles west of Callao Bay, Peru, where a depth of 3,367 fathoms was disclosed. . . . . . .

THE GEOGRAPHICAL SOCIETY OF LISBON is duly authorized to announce that in the year 1897 the Portuguese nation, under the presidency of the King and his government, will commemorate with public rejoicings and with every possible solemnity the departure from Lisbon of the expedition commanded by Vasco da Gama, which opened the ocean highway to the Orient.

The general plan of the celebration, elaborated by the Geographical Society, has received the approval of the Government and will be made known in a future communication.

AUTOGRAPH LETTERS OF MERCATOR.—Lieut. F. Van Ortroy prints, in Vol. IV, No. 3, Fifth Series of the *Compte Rendu* of the Royal Historical Commission (Belgium), four autograph letters addressed by Mercator in 1585 and 1586 to Henry von Rantzau, governor of Schleswig and of Holstein. The originals are preserved in the Palatine Library at Vienna. All were written at Duisburg.

The first letter has no special interest. In the second and third Mercator refers to the astrological studies, to which von Rantzau devoted himself, and points out to him in one place that, in making predictions for the year 1588, he will do well to note the fact that with it closes a period of 70 years from the first utterance of their doctrines by Luther and Zwingli, and that this period is to be compared with the 70 years of the Babylonish Captivity.

The fourth letter acknowledges the receipt of a gift from von Rantzau, and describes the progress of the maps on which Mercator was then engaged, and the expected arrival of some documents relating to Poland and Livonia;

> When these come to hand—he says—I shall set to work and measure everything exactly.

It is in this regard for accuracy, as Lieut. Van Ortroy remarks, that the merit of Mercator consists.

This letter was written in the midst of tumults. Alexander Farnese had just taken Neuss by storm, and the picture of the war then raging is drawn in a few lines:

> There is nothing new here, except that all things are miserable, where once we enjoyed the greatest peace and tranquillity. It is a cruel war, in which no one is spared; whether friends or neutrals, all are treated alike; hunger and scarcity of bread on every hand; and unless God put an end to the war, it is feared that very many will die of starvation, especially in France where, they say, the corn crop has been very short this year.*

THE ANDREA BIANCO MAP OF 1448, AND A SUPPOSED DISCOVERY OF BRAZIL IN 1447.—Under this title Signor Carlo Errera presents, in the *Memorie* of the Italian Geographical Society, Vol. V, Part 1, a careful study of this early map, which is preserved in the Ambrosian Library at Milan.

It is upon his interpretation of an inscription in this document that Mr. H. Yule Oldham constructs his theory of a Portuguese discovery of America, 45 years before the First Voyage of Columbus.†

The map is unique among Italian charts of the Middle Ages in that it is intended to represent only the western coast of Europe and Africa, and does not take in the basin of the Mediterranean. The European coast is shown from Heligoland to the Straits of Gibraltar, and the coast of Africa from the Straits to the farthest southern limit then known. Beyond the coast nothing is marked except, in Europe, a few river cities, and, in Africa, some water courses and imaginary mountains in the interior.

The Atlantic islands are delineated, with the errors characteristic of the cartography of the period. Scotland stretches so far to the north that it is cut off by the upper edge of the map. Its higher coast is without a name, and on the west appears only the Solway

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* Novi hic nihil est, nisi quod tristia sunt omnia ubi summa pax et tranquillitas esse solet. Bellum crudele, in quo nulli parcitur; sit amicus, sit neutralis, aequa sorte tractantur omnes; fames et magna caritas panis ubique; et nisi abbreviet Dominus bellum hoc, quam plurimos inedia perituros timetur, praecipue in Gallia, ubi hoc anno exiguum admodum frumenti proventum fuisse aiunt.

† A Pre-Columban Discovery of America, by H. Yule Oldham, M.A.—(*The Geographical Journal*, March, 1895.)

Firth. A strait from sea to sea separates Scotland from England. Ireland is much the same as in other maps of the time, but Bianco has added a good many names to the chain of islands drawn along its coast to the extreme south-western point.

In the representation of the Azores there is a change, introduced for the first time. All previous maps show these islands in three groups arranged along the same axis from north to south. These groups reappear in the map of 1448, and in addition to them, west of the coast line from Cape Finisterre to Cape Roca, are two others, one of five islands, the other, south of it, of two, and all lying north-west and south-east. These two groups are almost in the true position of the central and eastern Azores, which, in Signor Errera's opinion, they undoubtedly represent, according to the recent re-discovery by the Portuguese; the original three groups of the earlier maps being retained, because it was not then known that the new islands were identical with those already laid down off the Portuguese coast.

There is nothing noteworthy in the delineation of the Madeira and Canary Islands.

Greater care is bestowed upon the African coasts than upon those of Europe,. and it is in this part of the map that the inscription is found, to which so much importance is attached. It occurs within an outline of coast, about 200 miles in a south-westerly direction from Cape Verde, at the very edge of the parchment.*

According to C. Desimoni (*Atti della Società Ligure di Storia Patria, Vol. III, pp. cxiii–cxv, Genova, 1864*) the inscription reads:

A xola otinticha. Xe longa a ponente 1500 mia.

In the *Studj biografici e bibliografici sulla Storia della Geografia in Italia, Vol. II, p. 72*, is the following mutilated form:

ixole otintiche 1500.

In the reproduction of the map, published by Dr. T. Fischer (*Sammlung mittelalterlicher Welt-und Seekarten italienischen Ursprungs, u.s.w., Venedig, MDCCCLXXXVI*), the inscription takes this shape:

ixola otinticha ‖ X e longa a ponente 1500 mia.

Mr. Yule Oldham's reading is:

ixola otinticha xe longa a ponente 1500 mia.

According to Signor Errera the true reading of these words is:

ixola otinticha ‖ xe longa a ponēte | 500 | mia.

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* Previous readings were from photographic copies of the map. Signor Errera has had the good fortune to examine the original, which is clear and in good condition.

Mr. Oldham translates his text: *authentic island is distant 1500 miles to the west;* and this island he identifies with Brazil. Signor Errera thinks it not impossible that *otinticha* may be one of the many fantastic and unmeaning names which people the unknown Atlantic in the early charts; but he is ready to admit the sense attached to it as a form of the word *autentica.* There, however, he parts company with Mr. Oldham. The reading, *1500 mia*, is shown to be erroneous. In the original map the true figures—500—are marked off, according to the practice of the time, by an upright stroke at each end, but in the copies the second stroke seems to have been overlooked.*

The word *longa* in the inscription is translated *distant* by Mr. Oldham. According to this, *otinticha* is distant 500 miles to the west from Cape Verde, the nearest point on the African coast; but, measured by the scale of the map, the distance is only about 180† miles, and the direction, instead of west, is south-west.

If the word *longa* is to bear the usual meaning of *long* and to describe the extent of *otinticha* itself, as represented on the map, it is inaccurate, for the coast has a westerly extension of not more than 250 miles.

Mr. Oldham maintains that *otinticha* is the most easterly point of Brazil, which may be assumed to be Cape San Roque. From this point to Cape Verde the actual distance is 1,800 miles, or ten times that indicated on the Bianco map. The result of Signor Errera's examination is to relegate the *ixola otinticha* to the world of dreams.

For him, neither the Bianco map of 1448 nor Antonio Galvano's *Discoveries of the World* affords any support to the theory of a Portuguese pre-Columbian discovery of America.

He objects to this theory certain established facts: that the Portuguese of the fifteenth century had absolutely no knowledge of a land to the south-west; that Bianco's mysterious island is not to be found on any of their maps; that their historians are silent on the subject;‡ and that Cabral's accidental discovery of Brazil in the year 1500 took the Government and the nation by surprise.

This should be final, but no man lives to see the end of a theory.

THE JACKSON-HARMSWORTH EXPEDITION.—The steamer *Windward*, which carried this expedition to Franz Josef Land in the summer of 1894, arrived at Gravesend on the 22d of October last, with a report of the year's work.

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* It appears, none the less, quite distinctly in Dr. Fischer's photographic reproduction of the map, in the library of the American Geographical Society.

† The text reads: *100 miglia* ; evidently a printer's error.

‡ Galvano died in 1557, at the age of 54. His compilation, made not long before his death, first appeared in 1563.

The party landed at Cape Flora, on Northbrook Island, on the 10th of September, last year, and erected houses. Winter set in soon after. The first care was to secure a supply of fresh meat, and in this Mr. Jackson met with success, the bears and walruses furnishing enough to keep the men in good health for the winter months.

The Archangel house, which was christened *Elmwood* after Mrs. Harmsworth's place in Kent, was found to be an extremely comfortable dwelling. It was built of logs twelve inches square and lined throughout with felt. It was twenty feet square inside, with double windows and double roof, and it gave perfect protection against the weather. The bears sometimes looked in at the window and even rubbed their heads on the glass, but they never tried to break in.

The sun returned, February 23, and on the 10th of March Mr. Jackson and two others started to the northward.

They reached Peterhead, at the entrance to Markham Sound, after four days' journey through fog and driving snow, with the thermometer at 45° below zero. The ponies, which Mr. Jackson had taken with him, stood the climate very well and did excellent service. Mr. Jackson describes the country as

> "covered with a perpetual ice sheet, only interrupted at long intervals along the coast by lofty basaltic cliffs, having a steep talus of loose stones and soil. On this are found many sedges, mosses, and Arctic flowering plants, which form a contrast to the snow-covered slopes above as striking as it is pleasant. The country generally is well elevated, attaining an average height of 2,500 feet above the sea One of the most interesting facts connected with the coast is the number of old sea beaches, some of them being as high as 120 feet above the present shore.

Three depots of stores were established and two boats were left at a point in latitude 81° 20′, for use in the summer.

A second and even harder journey was made in April and May. Many observations for latitude and longitude were taken and geological specimens were collected. Much of the work of the Austrian expedition was found to be inaccurate. On this point Mr. Jackson expresses himself in the following language:

> We have entirely altered the map and character of a great portion of Franz Josef Land, and have found a sea and islands where mainland was supposed to exist. We have also carefully mapped Markham Sound, and, of course, laid down our route to the furthest point we reached, 81 20′ north. Markham Sound and the country further north are totally different from what Payer's map represents them to be, and the character of the small portion of Zichy Land, which borders on Markham Sound, is absolutely unlike the description published in the narative of the Austro-Hungarian

expedition. Moreover, the mountains in that work cannot be observed even on the clearest day.

The *Windward* will return to Franz Josef Land in June, 1896, with a reinforcement of picked men, and supplies for two years.

ANTARCTIC EXPLORATION.—The *London Times* of Nov. 29 has the following announcement:

> We learn with regret that the First Lord of the Admiralty has intimated that he would rather not receive a deputation at the present time on the subject of the renewal of Antarctic exploration under Government auspices. We believe the reason is that all the men and all the resources of the Navy are at present required to place our Fleet in a state of efficiency. The committee that has taken the lead in this movement will possibly decide to make an effort to interest the nation so far as to lead to a subscription sufficient to send out an expedition prepared to do two or three years' continuous work.

THE UNITED STATES BOARD ON GEOGRAPHIC NAMES.—This Board has just issued its Second Report containing the decisions rendered from January, 1892, to September, 1895. Two previous decisions are reversed.

Golovin Sound (Alaska), of the First Report, is changed to GOLOFNIN SOUND, and Woods Holl (south-eastern Massachusetts) is now to be written WOODS HOLE, to the comfort of the stranger, and the dismay of the local patriot.

According to the Executive order constituting the Board, its decisions are to be accepted by the Departments of the Government as the standard authority. Beyond this limit there is evidently no attempt at uniformity in the spelling of geographic names, and the time devoted to the consideration of the subject in geographical congresses cannot be said to have been well spent.

The public is of Dogberry's mind, that to write and read comes by nature, and it will not learn.

Even within a limited sphere, the difficulties in the way of consistent usage are very great, and the conflict of rules is sometimes fatal to one or the other, or both.

The policy of the Board on Geographic Names is set forth at length in the introduction to the First Report. It is there stated (p. 7) among other principles, that

> The forms of foreign names recommended for adoption are determined on consultation of established usage, the best authorities upon ethnological and political history and derivation, and current geographic and political information from authentic sources. . . . . It (the Board) hopes, however, that the way may be opened in the near future to the adoption throughout of the local forms of these names, and the rejection of the anglicized forms. In such specific cases as have been brought to its attention, it has decided uniformly in favor of the local form.

This local form is defined as that in use by the best authorities in the country having jurisdiction.

This accounts for *Kaffraria*, and *Kamerun* and *Massaua*, but it says nothing for *Kongo* and *Nova Zembla.*

The Portuguese form, Congo, has in its favour four centuries of history, the practice of all nations until within a few years, and the stamp of recognition by the authorities of the French Congo and the Congo State. Why is *Kongo* preferred?

Nova Zembla has prescription for it; but what becomes of respect for the local form, Novaya Zemlia, now almost universally adopted?

The work of the Board has been prosecuted under hard conditions. The members serve without compensation, and it does not appear that provision is made for the publication of their reports.

The total number of decisions is 5,364, including 2,791 names of counties in the United States. These are printed on pp. 47–56 of the First Report.

THE BOLLETTINO OF THE ITALIAN GEOGRAPHICAL SOCIETY, in a note on the Italian population of New York, makes the following statement:

> The American statistics cannot be taken as a basis. It will be sufficient to quote the fact that the census of 1890 gave only 182,000 Italians living in the United States, while it is certain that the number then approached and now exceeds 500,000.*

A wise man has said that nothing is certain, but death and taxes. There may be, at the present time, 500,000 Italians in the United States, but the number of 182,580 in the Census returns of 1890 is nevertheless to be accepted with confidence.

The Italian immigration was for many years insignificant. It amounted for the 60 years, 1821–1880, to 87,774, according to the statistics of the Italian Government,† but according to the tabulated statement in the U. S. Census Report for 1890 (*Population*, *Part I*, *p. lxxx.*) the total was 81,249. The difference is accounted for by the immigration into Canada and British Columbia, which are frequently included, in the Italian returns, with the United States, and in some degree by the fact that the American Census is taken in the middle of the calendar year.

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* Non si possono prendere per base le statistiche americane; basterà citare come il censimento del 1890 dasse per residenti agli Stati-Uniti soli 182,000 Italiani, mentre è certo che allora avvicinavano e ora passano il mezzo milione.

(Bollettino della Soc. Geog. Italiana, Ser. iii, Vol. viii, Fas. x, p. 325.)

† The figures are taken from the *Statistica della Emigrazione Italiana all'Estero nel 1881, confrontata con quella degli Anni Precedenti, ecc. Roma, 1882 :* Published by the *Direzione della Statistica Generale.*

In 1880 the number of resident Italians was 44,230. There were added to these in the next 10 years 208,792, and the apparent total for the year 1890 is, therefore, 253,022.

From this total must be deducted, however, the mortality for the 10 years, and the immigration into Canada.*

It is well known that for the most part the Italians take up their abode in the large cities of the country. The annual death-rate of the white population in 12 of these cities, was:†

Newark	28.67	per	1,000
New York	28.47	"	"
Chicago	21.03	"	"
Philadelphia	22.28	"	"
Brooklyn	25.41	"	"
St. Louis	18.15	"	"
Boston	24.62	"	"
San Francisco	23.57	"	"
New Orleans	25.41	"	"
Buffalo	19.83	"	"
Baltimore	22.61	"	"
Pittsburg	21.56	"	"

The average of these figures is 23.47; but those who are acquainted with the conditions of Italian life in America cannot doubt that the death-rate among people of that nationality is very nearly as high as that recorded for the City of New York. If the annual rate were no higher than 23.47 per 1,000, it would account for 59,353 persons of the apparent total for 1890, and leave 11,089 for the Canadian quota. If the death-rate is estimated at 27 per 1,000, the apparent total for 1890 will be reduced to 184,712, which exceeds the Census figures for 1890 by 2,132 persons, to be looked for in Canada and British Columbia.

There has been a great increase in the volume of the immigration for the past five years. The *Almanach de Gotha* for 1895, taking its figures from the Italian official publication, makes the number of departures for the United States alone, in the four years, 1890–1893, 185,029. An approximate total for the beginning of the year 1895 may be reached by adding together these figures:

Census return for 1890	182,580
Immigration, 1890–1893	185,029
Estimate for 1894	50,000
	417,609

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* This latter, though an unknown quantity, must not be forgotten.

† Compendium of the Eleventh Census, 1890. Part II, Miscellaneous Statistics, p. 5.

In a question of this kind, it does not appear that any other authority can take the place of the official census.

EXPLORATION OF TALAMANCA.*—The report of this exploration, performed by the late William M. Gabb in 1873–1874, is now published for the first time in this translation from the English manuscript. It is preceded by an introduction in which Señor Pittier, the director of the *Instituto*, pays a tribute to the memory of Mr. Gabb, and an appendix contains a classified list of the batrachia and reptilia collected, and described in 1875 by Dr. E. Cope, of Philadelphia.

The district of Talamanca occupies the south-eastern corner of Costa Rica.

It is watered by the rivers Tilorio, or Changuinola, and Tiliri, or Sixsola,† and along the coast the land is low and marshy, behind a narrow strip of sand thrown up by the sea.

In the interior the land rises rapidly and the hills sometimes reach a height of thousands of feet. In the lowlands the water covers the earth in the rainy season to a depth of ten feet. Near the coast grows a dense vegetation of dwarf palms, and in the driest spots the agave flourishes.

In the centre of Talamanca, on the Tiliri River and about the mouths of its principal tributaries, there is an area of undulating plains, covering between 100 and 150 square miles of soil, for the most part sandy, even rocky in some places, and in others showing beds of clay. This region needs only to be cleared of its forests to become agricultural land of the best quality.

The rising ground is of uniform character. Except in the valley of Cabécar, the hills of Talamanca have very narrow crests, only a few feet in width, and the sides slope at so steep an angle that it is no easy matter to find a piece of ground suitable for cultivation. Urén, the most thickly peopled district, is almost stripped of forests and is laid out in plantations of maize, plantains and sugar cane and in pasture lands, where not even a stump of a tree appears.

Bribrí, on the Lari River, probably the Biceita of the Spaniards, resembles Urén in its features, but is much less developed.

Cabécar extends to the sources of the river Coén. At the beginning of the 18th century it was the centre of a most important colony. It was united by a good road to Cartago, and it is said that very rich mines existed in the neighborhood; but the indications are that the principal industry of those days was stock-raising. Situated as it is in the heart of the cordillera Cabécar might easily be made accessible. A road of 25 miles in length would bring it into communication with the Tiliri River, at the point where it is permanently navigable and practically unaffected by the freshets of the rainy season.

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* Anales del Instituto Fisico-Geografico Nacional de Costa Rica. Tomo V. 1892, pp. 71–90. 4to. San José de Costa Rica, 1895

† Tilorio and Tiliri are the native names and Gabb uses them in preference to the others, which are of Mosquito origin.

The soil is the richest in Talamanca, composed as it is of the same black earth which supports the famous coffee plantations around the city of San José.

At the head-waters of the Taberí, which are reached by following the old Spanish road, the country puts on another aspect, of rugged mountains covered with impenetrable woods. Except by a few Indians, descendants of the refugees of 1709, the region is uninhabited.

The valley of the Tilorio River is narrow and precipitous and the whole population is reduced to one hundred and three persons. The river bed is so full of rocks that navigation is out of the question, and the descent to the banks is excessively steep.

In the Zhorquin valley, however, there are some good farming lands and the remains of former plantations testify to a comparatively dense population, now disappeared.

According to the natives, the Tilorio takes its rise in a lake on the bare top of a mountain, once a volcano.

Mr. Gabb made the ascent of the Pico Blanco, previously unattempted. He followed the hunter's track along the mountain ridge between the Urén and the Larí, scaling precipices, clinging to the face of the rocks and crossing gullies by improvised bridges. The party was composed of twenty-one persons, mostly carriers, and the peak was reached after seven days' struggle through the dark, wet forest.

The Pico Blanco, the highest point of Talamanca, has an elevation of 9,562 feet. The Urén drains the north-eastern slope, while the Larí receives the waters of the northern side. The streams that descend the southern slope flow into the Pacific.

It has always been asserted that the Irazú (near Cartago) is the only mountain from which both oceans may be seen at the same time. The view from the Pico Blanco is incomparably more extended. The stretch of the Caribbean between Limon and Puerto Viejo was clearly visible, together with the islet of Uvita and the breakers on the reefs of Punta Cajuita; while, on the other hand, the Pacific Ocean, thirty or forty miles distant, seemed to be at the feet of the observer. From the summit the crest descends rapidly for some miles till it is not much more than 3,000 to 3,500 feet above the sea. It then rises again, to sink once more between the Diparí and the upper valley of the Coén, which is dominated by a remarkably beautiful peak. Beyond this depression, the crest has a medium altitude of between six thousand and seven thousand feet.*

The climate of Talamanca differs little from that of other parts of the country. It is very unhealthy near the coast and on the lower course of the streams, and the fevers are frequently fatal, even to the Indians; but in the interior natives of northern Europe and America easily become acclimated, on the single condition of living with prudence.

In the higher regions the climate is in every respect a good one, and the valleys of the Urén, Bribrí and Cabécar are admirably suited to the people of the temperate zone.

There are two dry and two wet seasons of the normal year. The rains begin in May or June and last till the end of July; August and September are dry; showers fall now and then in October, and the next three months bring abundant rain; February, March and April are one long, dry season.

A large part of the Report is devoted to the geology of this interesting region. Briefly described, it is of recent sedimentary rocks, almost all metamorphic, and at various points on the coast small masses of yet more recent rock make their appearance.

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* Señor Pittier makes the following comment on this passage :

"This description of the part of the Cordillera of Talamanca which is to the north-westward of the Pico Blanco does not agree with the facts. The maps of the English Admiralty assign to that peak an altitude of 10,200 feet (3,109 m.), but I hold to the opinion that the figure given in the present Report more nearly approaches to the truth because I have had an opportunity to compare the barometer (made by Green) with which Gabb conducted his observations, and in addition to this the revision of the original calculations, which also came into my hands by accident, convinced me of their accuracy and of the correctness of the process followed in the operations. But it may be affirmed that in the whole of the main Cordillera of Costa Rica, from the Pico Blanco to the Cuello de las Cañas, there exists no depression lower than 5,000 feet, or about 1,500 metres. Moreover, the Pico Blanco is by no means the most lofty summit of Talamanca. The Cerro de Buena Vista, which occupies nearly the position of the Cerro de la Laguna, or Montaña Dota, in the maps of Gabb and his predecessors, is 3,299 metres (10,824 feet) in height; the Chirripó Grande, the Mount Walker of the North American hydrographers, which lifts its mighty mass to the west of San José de Cabécar, towards the head-waters of the Boali, undoubtedly surpasses it, and the mean level of the main Cordillera exceeds 7,000 feet (2,100 metres).

The nucleus of the great interior Cordillera consists of granite and syenite, traversed by dykes of volcanic origin, identical with those of northern Costa Rica.

THE INSTITUTO GEOLÓGICO DE MÉXICO announces the death of its founder and director, Don Antonio del Castillo, in the City of Mexico, on the 27th of October last.

POPULATION OF BERLIN.—A census, taken on the 2d of December, showed that the population of Berlin was 1,674,112. The increase for the five years, 1880–1885, was 16 per cent.; that for the period 1885–1890 was 20 per cent.; and for 1890–1895 only 6 per cent. This falling off is explained by the growth of the suburbs.

MISS KINGSLEY IN WEST AFRICA.—The London *Times* of December 6 reports the adventures of an English lady, Miss Kingsley, who left Liverpool a year ago to travel for the second time in West Africa for the purpose of collecting specimens of the fishes and studying, at the same time, the customs of the natives.

Landing at Old Calabar, Miss Kingsley proceeded to the French Congo and expressed her desire to explore the gorilla country and to ascend the Ogowe River. The authorities could not guarantee safe navigation beyond Lambaréné, 130 miles from the sea.

The start was made in a canoe with a crew of eight men. The canoe was upset many times in the rapids, and there were several occasions when Miss Kingsley barely escaped with her life.

Travelling overland through the country of the cannibal Fans (Fangwe), the party found every town in a state of defence, and at each one the people stopped the expedition and wanted to eat the three Fans, elephant men, who were with Miss Kingsley. In all this country there was no burial place, but in most of the mud huts pieces of human flesh were kept for provisions.

Many large gorillas were seen, but they made off as the men approached, except in one case, when the animal attacked and was killed by the elephant men. This gorilla was 5 feet 7 inches in height.

Miss Kingsley crossed the unexplored lake N'Covi (N'Comi ?), which is about 10 miles wide and 15 miles in length. She crossed also the range known as the Sierra de Crystal, which has an altitude of from 6,000 to 8,000 feet,* and is reached through a swampy country.

Returning to the coast of the Gaboon, Miss Kingsley explored

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* Previous estimates vary between 1,800 and 3,000 feet.

Corisco Island. She afterwards ascended the Kamerun Mountain, and the Rumpi range, farther to the northward. This range, according to the *Times*, is inhabited up to a height of 7,000 feet, but Kiepert's map ascribes to it an elevation of not more than 6,000 feet * (1,800 metres).

It is probably confounded in the report with the Kamerun, as immediately after it is stated that the great crater is 10,000 feet above the sea, and that there are 70 craters in the Kamerun Mountains.

The fishes collected in this expedition were fresh-water specimens, destined for the British Museum.

THE NOR'-WESTERS OF CANTERBURY.—In the *New Zealand Alpine Journal*, Vol. II, No. 8, the editor, Mr. J. T. Meeson, has a paper on the hot, dry winds that blow from the north-west across the mountains and over the eastern plains of both islands, and are felt in their greatest intensity in the province of Canterbury, in the South Island.

These winds are most frequent in the late spring and summer, from October to March, with their greatest strength, perhaps, in February, at the time of the wheat harvest. The Nor'-Wester comes on as follows: the wind blows for two or three days from the north-east and then dies away, or veers to the north; light, cirrus clouds drift in the upper sky from the north-west; the barometer falls, sometimes very fast, and the thermometer rises. A few hours of delicious weather succeed and then, within twenty-four hours or less, comes the north-west wind, gentle, at first, and even cool, with an occasional warm puff. A beautiful arch of cumulus clouds stretches across the heaven from the north to the west or south-west, and below it the sky is of a peculiar, soft blue. The arch sometimes remains through the storm; sometimes it is dissipated in a few hours. The force of the wind increases to a gale, with clouds of dust and a stifling heat. Vegetation droops and withers, and human beings suffer with lassitude, headache and neuralgia. The mountains, to the west, are covered with black cloud—*the true Föhn wall*—and there heavy rain falls.

This state of things lasts sometimes for days, sometimes for a few hours, when the wind veers to the west, the barometer rises, the thermometer falls, and a cold south-west wind sets in for a time, and often the process begins again. Mr. Meeson regards this hot wind as a true *Föhn*, and he accounts for it in this way: The north-west wind, charged with moisture, strikes the west coast at a temperature of 60° Fahr. By the time it reaches the tops of the mountains at 9,000 feet, it loses 30° of heat, while in descending the eastern side of the mountains it gains 50° and reaches the Canterbury plains as a dry wind, with a temperature of 80° Fahr.* To this temperature is added the heat always developed in front of a cyclone.

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* The map of the Kamerun Coast Region, in the *Mittheilungen aus den Deutschen Schutzgebieten, VIII Band, 1 Heft*, makes the altitude of the Rumpi Berge 1,500 metres (4,921 feet).

The Nor'-Wester is, on the whole, a beneficial agent. Some persons hold that it is essential to the maturity of the wheat crop; it kills or blows away the germs of disease, purifies the atmosphere, melts the snows and plays a great part in the development of animal and vegetable life.

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* Julius Hann and others have shown that in ascending and descending wet air loses or gains 1° Fahr. for every 300–400 feet, and dry air 1° for every 183 feet.

BOOK NOTICES.

(*N.B.—It is requested that works submitted for review be addressed to the* EDITOR.)

The English Lakes. With Bathymetrical Maps and Illustrations. By Hugh Robert Mill, D.Sc., F.R.S.E. 8vo. London, 1895.

(*From "The Geographical Journal" for July and August, 1895.*)

Dr. Mill's paper was read before the Royal Geographical Society in June, 1894, and an abstract, accompanied by a discussion, appeared in the *Geographical Journal* for September, 1894.*

The lakes surveyed lie within a circle of 30 miles in diameter, in the famous Lake District of north-western England. Geographically, the district may be described as an elevated land, highest in the centre and furrowed by a series of valleys running from the centre toward the circumference, like the spokes of a wheel. Most of the valleys contain long, narrow lakes, differing in type from the small, round mountain tarns of the district. Until Dr. Mill's survey was undertaken, there had been no attempt to construct definite maps of the basins. Some of the results obtained were printed in tabular form in the BULLETIN of September 30, 1894. †

The largest lakes, Windermere and Ullswater, are divided into distinct basins. In the former, the deep and wide upper part is separated by the island-shoal off Bowness from the narrower and more shallow lower basin; while in Ullswater each of the three reaches of the lake is marked off by a bar. Three of the lakes, Wastwater, Windermere and Coniston, descend below sea-level.

Dr. Mill's paper, which is of permanent value, is illustrated by a general map of the District, on a scale of 3 miles to an inch, 7 other maps on a scale of 2 inches to a mile, and 20 illustrations, mostly from photographs. Each map is accompanied by sections, and shows, besides the lake surroundings, the land contours from the Ordnance Survey. All the maps are carefully tinted.

The Discovery of Australia. A Critical, Documentary and Historic Investigation concerning the Priority of Discovery in Australasia by Europeans before the arrival of Lieut. James Cook, in the "Endeavour," in the year 1770. With Illustrations, Charts, Maps,

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* Not 1895, as the Preface reads.

† Journal of the American Geographical Society, Vol. XXVI, p. 394.

Diagrams, etc., Copious Notes, References, Geographical Index and Index to Names. By George Collingridge, Member of the Council of the Royal Geographical Society of Australasia, Sydney, New South Wales, Hon. Corresp. Member of the Royal Geographical Society of Australasia, Melbourne, Victoria, etc., etc., etc., Founder and First Vice-President of the Art Society of New South Wales, Sydney. 4to. Sydney, 1895.

Mr. Collingridge has brought together in this handsome volume practically all the early notices of Australia. He begins with the Chaldean conception of the earth and the Greek traditions, of which he cites the one preserved by Ælian, as translated by Fleming, in 1576, and quoted by Mr. R. H. Major:*

> Theopompus declareth that Midas the Phrygian and Selenus were knit in familiaritie and acquaintance. This Selenus was the sonne of a nymphe inferiour to the gods in condition and degree, but superiour to men concerning mortalytie and death. These twaine mingled communication of sundrye thinges. At length, in processe of talke, Selenus tolde Midas of certaine ilandes, named Europia, Asia, and Libia, which the ocean sea circumscribeth and compasseth round about; and that without this worlde there is a continent or parcell of dry lande, which in greatnesse (as hee reported) was infinite and unmeasurable; that it nourished and maintained, by the benefite of the greene medowes and pasture plots, sundrye bigge and mighty beastes; that the men which inhabite the same climate exceede the stature of us twise, and yet the length of there life is not equall to ours; that there be many and divers great citties, manyfold orders and trades of living; that their lawes, statutes, and ordinaunces, are different, or rather clean contrary to ours. Such and lyke thinges dyd he rehearce.

The lines next quoted from Manilius refer to Australia as those from Seneca do to America. Mr. Collingridge just mentions Ptolemy and Strabo, and has no hesitation in deciding that Marco Polo considered *Java and Australia as one*, and called it Java Major.

With the fifteenth century and the maps the field widens, and Mr. Collingridge finds firmer ground, though he accepts Galvano's report of the map brought to Lisbon from Venice in 1428 by Dom Pedro of Portugal.† The notices and delineations, more or less definite, of Australia and the neighboring islands, are followed from year to year with patience and assiduity to this result:

> In conclusion, we feel inclined to say with Alexander Dalrymple that "there is nothing new under the sun," and that Australia must have been known from the remotest antiquity.

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* Early Voyages to Terra Australis, now called Australia: etc., etc. Edited, with an Introduction, by R. H. Major, Esq., F.S.A. 8vo. (*Introduction, p. iii.*) London (Hakluyt Society), 1859.

† The Discoveries of the World, etc., etc., by Antonio Galvano, etc. Corrected, etc., by Richard Hakluyt (1601). 8vo (p. 67). London, Hakluyt Society, 1862.

Ecclesiastes seems to have anticipated Dalrymple, and it is far from likely that Australia was known to the remotest antiquity. Midas and Manilius do not meet the requirements of the case. Neither are the indications in the mediæval maps conclusive. Important as they are, it is easy to overestimate their importance where they designate regions as yet unvisited by Europeans.

It is probable, as Mr. Major has shown, that the Portuguese reached Australia in the sixteenth century; but the real discovery, in the usual sense of the word, dates from the year 1606, when Torres sailed through the strait that bears his name, and the Dutch landed at Cape York.

The numerous reproductions of maps in the volume are very well done.

The Land of the Nile Springs, being Chiefly An Account of how we fought Kabarega. By Colonel Sir Henry Colvile, K.C.M.G., C.B., Grenadier Guards. Illustrated by Mr. J. Burrell-Smith and Mr. Twidle from Sketches by the Author and Major Thruston and from photographs by the Author. 8vo. Edward Arnold, London and New York, 1895.

Col. Colvile says in his preface that he wrote, some years ago, an official history of a campaign, and that he has contributed a good deal to Blue Book Literature. He adds:

> I trust that the habits acquired during these experiences may be considered a sufficient excuse for any items of useful information that I may have allowed to slip into the following pages.

It is easy to forgive imaginary sins, but there is no excuse for this book. Col. Colvile's line of march was from Mombasa to the Victoria Nyanza and the Albert Nyanza, and detached expeditions were sent off to the right and to the left. Kabarega kept himself pretty well out of harm's way, after setting his capital on fire before the enemy reached it. The native forces, on both sides, were shy of fighting, the real work being done by the Sudanese, who make good soldiers.

Two maps and a number of fair illustrations enliven this uninteresting story.

Expedición Científica al Popocatepetl. José G. Aguilera y Ezequiel Ordoñez, geólogos de la Comisión Geológica Mexicana. 8vo. México, 1895.

The report of this expedition is dated October, 1894. It begins with a brief description of the country around the City of Mexico and the hydrographic importance of the Sierra Nevada, also called Sierra de Ahualco, of which Popocatepetl forms the southern extremity. Seen from a distance, the mountain has the form of a cone, interrupted by a lateral peak on the north-western side and another, hardly distinguishable, on the south-west; but, on a nearer view, the regularity disappears, and the volcano presents itself as an elliptical cone, with its major axis in a north-western and south-easterly direction. The summit is obliquely truncated by the enormous crater, the highest wall of which, known as the Pico Mayor, is on the north-western side. The crater forms an ellipse of about 2,000 feet by 1,300, and its depth from the Pico Mayor to the surface of the little lake at the bottom is nearly 1,700 feet.

The mountain belongs to the class of *stratified volcanoes*, in which layers of breccia, sand, ashes, etc., are superimposed upon the lava and are, in turn, covered by a later flow. All the lava-currents of Popocatepetl follow the inclination of the slope of the exterior cone, and this fact supplies the authors with an argument against the conclusion of Felix and Lenk* that the Pico del Fraile, on the side of the mountain, is the remnant of an ancient crater. It appears, on the contrary, to be the result of a process of erosion.

The paper is illustrated by four plates, a geological section of the country between Mexico and Popocatepetl, and a plan showing the formations; both maps in colours.

Projet de Construction d'un Globe Terrestre, à l'échelle du Cent-millième, par Elisée Reclus. Pamphlet. (Bruxelles?) 1895.

This pamphlet contains two papers: the one in which M. Reclus unfolds his scheme for the construction of a globe of 1,200 or 1,300 feet in circumference, and another, signed G. G., which presents arguments in favour of the scheme and details of probable cost, manner of erection, etc.

There is no denying the main thesis, that the globe is superior to the map for truthfulness of representation of surfaces and related parts of the earth; but M. Reclus strains his ingenuity to exaggerate the shortcomings of the map. If all that he says on this point is true, there is small consolation left for the subscribers to his Universal Geography, a work begun and carried to completion, it is now confessed, without the means of exact information.

The proposed globe is to be set on some hill, 160 or 170 feet in height, near a great capital, in a building, necessarily vast, but none the less architecturally fine. Stairways and galleries, properly disposed, will give access to any portion of the earth's surface, accurately represented for the first time, and will no doubt be thronged by students from every land.

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* Beiträge zur Geologie und Palæontologie der Republik Mexiko. (Aus: *Palæontographica*, 37.) Stuttgart, 1891.

According to G. G., practical effect may be given to this grand conception at a cost of about four million dollars.

It is not too late to suggest a modification or extension of the plan, in the interest of those who must do their studying in places remote from the fortunate capital which is to possess the model globe. Why may not lesser globes,—satellites, so to speak, of the great earth—of 200 and 100, and even of 50 feet in diameter, be constructed and made to revolve on their own axes from one end of a country to the other, as so many object lessons to young and old? The spherical form lends itself to a number of excellent purposes.

Übcr die Fortschritte der geographischen Namenkunde. Von Prof. Dr. J. J. Egli in Zürich. (*Geographisches Jahrbuch, 1895.*)

This Report covers the two years 1893 and 1894, and, like the five previously published, furnishes a vast amount of solid information concerning the etymology and derivation of place-names, set forth in a lively and original style.

At the outset Dr. Egli calls attention to two difficulties which hinder the labourer in this field. One is the dilettantism, which puts on the garb of science. It ought to be self-evident that only a German scholar can do profitable work on the place-names of a German district, a Slavic scholar on those of a Slavic region, and that no good purpose is served by gathering together conjectures and opinions and assertions instead of well-ascertained results. Such work has absolutely no value. At the same time, good work may be done by the man without philological knowledge, if only he is mindful of the saying: "Cobbler, stick to your last!" He can still collect names or furnish literary and historical contributions.

The other difficulty is the lack of acquaintance with the literature of the subject. It happens that a writer knows only a few of his ten or twenty predecessors, and those not selected, but picked up by chance, and then opinions long since refuted rise to the surface once more as new knowledge, and correct information is buried. This may well be called a Sisyphus labour, to vex the soul.

In the pages devoted to America (86–89) Dr. Egli notices: the renewed apparition of the "hobgoblin" story about the native origin of the name *America*, told by T. H. Lambert, A. L. Pinart and Jules Marcou; Ernesto do Canto's paper on the name *Labrador;* Prof. Davidson's identification of names on the Californian coast; Brackebusch's contribution on the names of passes in the Andes of Chile and Argentina; and an article by V. Reyes on the place-names of the Mexican State of Morelos.

He gives, on the authority of the explorer Coudreau, the following explanation of the name Guayana (Guiana):

> The name of the region is formed from that of the tribe *Uayanas*, or *Guayanas;* so the savages called themselves after a great tree.

In his *Nomina Geographica* (second edition) Dr. Egli quotes Varnhagen's rendering of the word: *Guayá-ná*= "We the outlawed people."

On pages 92–93 the Decisions of the United States Board on Geographic Names are criticised. We are left in the dark, it is said, by the omission of the apostrophe in *Georges rock* and *Greens ledge*, whether the true reading is *George's* and *Green's* or *Georges'* and *Greens'*. We find *Sao Paulo* by the side of *São Paulo*, and the bastard form *New Grenada*, and no attention is paid to etymology. The Board seems only to deal with letters; to pick out here an *e* or an *a*, and there an *o* or a *u*, and to reject or retain an *h*.

The Gold Diggings of Cape Horn. A Study of Life in Tierra del Fuego and Patagonia. By John R. Spears. Illustrated. G. P. Putnam's Sons. 8vo. New York and London, 1895.

Mr. Spears visited Patagonia as a reporter of the New York *Sun*, and his work is—so he tells us in his preface—what may properly be called a collection of newspaper sketches rather than the conventional story of a traveller; but the sketches have their value.

The dedication of the book puts the reader on his guard:

> To all who love the red aborigines of the Americas
> As God made them.

No one can doubt that the good Indians have been ill-treated; but, sentimentalism apart, both white and red may be said to have been made by God, and there is, perhaps, more hope of the white men.

The gold diggings never amounted to much, but they attracted the usual floating population to the country, and Punta Arenas, the business centre of the Cape Horn Archipelago, is now, according to Mr. Spears, a town full of enterprising people, who will make their way in the world.

There is an interesting chapter on the Welsh Colony of Chubut, planted in 1865, its ten-years' struggle and complete success, and two others describe the birds and beasts. It appears, from the explanation given by the Gauchos, that Darwin was in error when he concluded that the guanacos sought a favorite spot when about to die.* The Gauchos said that about every three years there was a terrible winter, when the guanacos, to escape the storms, took shelter by thousands under the lee of the bushes, and died there of starvation if the tempest lasted, as it often does, for days at a time.

A great industry in Patagonia is sheep-farming, which may yet be widely extended without disturbing the desert charm of the land, deeply felt and well described by Mr. Spears.

The illustrations, mostly reprints, are effective.

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* Journal of Researches, etc., during the Voyage of H. M. S. Beagle, etc., Chapter VIII.

MAP NOTICES.

Atlas of the United States.

Of the great atlas of the United States by the U. S. Geological Survey, 46 additional sheets have been received, of which 40 are on a scale of 1 : 62,500, and 5 on a scale of 1 :125,000, the remaining one being on a special scale of 1 : 25,000.

Of this number, no fewer than 24 sheets, more than one-half, are in New York State and are on a scale of 1 : 62,500. This large number of sheets, which represent 5,400 square miles of the area of the State, are a part of the fruits of co-operation between the State and the U. S. Geological Survey, which was in progress two years ago, and which has, unfortunately, been discontinued. The regions represented by these sheets, each of which comprises some 225 square miles, are indicated by their names. Rouse Point and Mooers are at the northeast corner of the State, Plattsburg and Willsboro are on Lake Champlain, Whitehall, Fort Ann and Cambridge are farther south, on or near the Hudson; Ausable is in the Adirondacks, Stony Island, Watertown, Cape Vincent, Sacketts Harbor and Pulaski, are near the outlet of Ontario. Oriskany, Oneida, Chittenango and Syracuse are on the upper waters of the Mohawk and Oswego Rivers, Ithaca and Elmira are on the south border of the State; Rochester and its neighbor on the north Ontario Beach need no descriptive location; Amsterdam is in the Mohawk Valley, while Catskill and Rhinebeck are in the Hudson Valley. These areas are scattered widely over the State, as is seen, and many regions widely differing in topography and geology are represented.

The Crawford Notch sheet, New Hampshire, 1 : 62,500, completes a square of 900 square miles comprising the highest and most frequented part of the White Mountains.

The Hickory sheet, 1 :125,000, is in the Piedmont region of North Carolina. The Wartburg sheet, Tennessee, 1 :125,000, is an example of the wooded Cumberland plateau of East Tennessee. The Bodreau sheet, Louisiana, 1 : 62,500, completes a large area of the strange topography about the lower Mississippi.

In Florida are five sheets, scale 1 : 62,500, representing the curiously irregular topography of that little known State. These are known as Citra, Ocala, Panasoffkee, Tsala Apopka and Williston.

In Michigan are found three sheets, scale 1 : 62,500; one, compiled from the work of the U. S. Lake Survey, upon Isle Royale, known as Passage Island sheet. The others, Ned Lake and Perch Lake, are on the upper peninsula.

Wisconsin receives one sheet, Baraboo, scale 1:62.500, and Minnesota also one, Duluth. This includes the harbor, formed by the curious bars across the head of Lake Superior, and the high steep bluffs of the north shore.

In North Dakota is one sheet, Savo, 1:62,500, situated in James River Valley; in Nebraska are two, Grand Island and Wood River, both representing sections of the broad valley of the Platte. Our latest Territory, Oklahoma, has one sheet, Kingfisher, 1:125,000, representing the eastern border of the plains. In Texas are two sheets, Sherwood in Central Texas and Marfa in Trans Pecos, Texas, both on scale 1:125,000. The latter represents the broad valleys of the region, intersected by eroded trachyte net ranges. The Aspen sheet, Colorado, 1:62,500, presents an area of the rugged Elk Mountains of that State.

The list closes with the Cripple Creek sheet, Colorado, scale 1:25,000, which represents the topography of the greatest gold-mining camp since the days of '49 in California.

Among the miscellaneous maps issued recently by the U. S. Geological Survey should be mentioned a map of the State of Connecticut, scale 1:125,000, reduced from the large scale sheets of the State. Relief is shown by contours at 100 ft. One issue of this map shows the distribution of woodland in detail over the State. It represents it as scattered in small patches, alternating with areas of open, cultivated land. It is somewhat heavier in the north and especially in the northwest than elsewhere. Altogether about 38 per cent. of the area of the State, or somewhat more than a third, is wooded. Of course, very little of this is original forest; indeed, little of it is old and large enough for lumber, but only for firewood and kindred uses.

Atlas de Géographie Historique. Par une réunion de Professeurs et de Savants, sous la direction géographique de F. Schrader. Paris, Librairie Hachette et Cie, 1895.

Parts 13 and 14 of this important work have been issued. These contain maps showing (Part 13) The East after Alexander; The World in 1789; The Progress of Discovery in the 19th Century; (Part 14) The Byzantine Orient; The French Region at the end of the 10th Century, and The Europe of Louis XIV.

This work will comprise 54 double-page maps, printed in colors, accompanied with text and with a large number of detailed maps, figures and diagrams.

Koninklijk Nederlandsch Meteorologisch Instituut. De Guinea en Equatoriaal Stroomen. J. van Druten. Utrecht, 1895.

This atlas comprises a compilation of all reliable observations of current, water and air temperatures and wind, relating to the Guinea and Equatorial currents, which have been made between latitudes 2 and 24 N. and between longitudes 2 and 29 W. of Greenwich. They are arranged by months, and are grouped and the results stated by "square degrees," *i. e.*, the area included between two consecutive parallels and meridians. There are 5 maps relating to each month. Upon the first is simply a list of the observations collated. Number 2 presents, in each square degree, the resultant of the current observations, distinguishing those of the Equator from those of the Guinea current. Number 3 shows the curves of air temperature; number 4, of the temperature of the surface water, and nnmber 5, the wind directions and velocities and the areas of rain.

The text is limited to an explanation of the maps and no conclusion, from study of them, is attempted. This is regrettable, as the familiarity with the data, which the compiler must have acquired in the course of his work, would make his generalization and deductions of value. But this is a matter of little importance, in comparison with this superb compilation and arrangement of facts.

E. Debes. Neuer Handatlas, uber alle Theile der Erde in 59 Haupt- und weit über 100 Nebenkarten, mit alphabetischen namenverzeichnissen. H. Wagner, und E. Debes, Leipzig.

Parts 16 and 17 of this excellent atlas have been issued. These contain a general map of Asia, maps of north and south and Equatorial Africa, the eastern part of the United States and South America, with detailed maps of special localities.

The work retains its high character.

Atlas der Oesterreichischen Alpenseen mit unterstützung des hohen K. K. Ministeriums für Cultus und Unterricht, herausgegeben von Dr. Albrecht Penck, und Dr. Eduard Richter. Wien, Ed. Hölzel, 1895.

This atlas, of which several parts have been issued, presents detailed maps in contours, upon scales of 1 : 10,000 to 1 : 25,000, of the lakes of the Austrian Alps, and their immediate surroundings; together with soundings and the contours of their bottoms. Land relief is further expressed by tints of brown and of the lake bottoms by tints of blue. These maps are of great value in a study of the results of glacial action.

"The Times" Atlas, containing 117 pages of maps, and comprising 173 maps, and an alphabetical index to 130,000 names. Published at the office of "The Times," Printing House Square, London, E. C., 1895.

This, the latest addition to the atlases of the world, presents few distinctive points which warrant special mention. Opening with maps of the heavens and the moon, it reaches the earth with plate 3. Published in London, of course the British Empire receives the fullest treatment, and next to that, Western Europe, while our own country is dismissed with three maps, one of the country as a whole, and one each of the Eastern and Western States, upon a slightly larger scale.

Besides general geographic maps the atlas contains climatic, hypsometric, ethnographic and religious maps. The execution of the maps would be worthy of great praise were it not that they are unduly crowded with detail, and much of the lettering is too fine for easy reading.

The index to place names refers to projection squares, not, however, by latitude and longitude, but by numbers and letters. The use of the projection lines for this purpose is, however, a distinct step in advance in this regard.

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An account of the Smithsonian Institution, Its Origin, History, Objects and Achievements, The Exhibit of the Smithsonian Institution at the Cotton States Exposition, Atlanta, 1895; Miscellaneous Collections: No. 971, Indexes to the Literatures of Cerium and Lanthanum, by W. H. Magee, Ph.D.; No. 972, Index to the Literature of Didymium, 1842–1893, by A. C. Langmuir, Ph.D.; Smithsonian Contributions to Knowledge: No. 980, On the Densities of Oxygen and Hydrogen, and on the ratio of their Atomic Weights, by Edward W. Morley, Ph.D.

From the Department of State, Washington :

Consular Reports, Nos. 181, 182, 183; Special Consular Reports, Vol. XII, Highways of Commerce. The Ocean Lines, Railways, etc., of Foreign Countries; Fur Seal Arbitration. Proceedings of the Tribunal of Arbitration at Paris, 1893, 8 volumes.

From the Weather Bureau, Washington :

Monthly Weather Review, February, March, April, May, June and July, 1895.

From the American Antiquarian Society, Worcester :

Proceedings, Semi-Annual Meeting held in Boston, April 24th, 1895, Vol. X, Part 1. (New Series.)

From the Worcester Society of Antiquity, Worcester :

Proceedings for the Year 1894, Part 1 of Vol. XIV.

From the Historical and Library Association, Yonkers :

Bulletin, Vol. I, No. 1, April, 1895.

TRANSACTIONS OF THE SOCIETY.

November–December, 1895.

A Regular Meeting of the Society was held at Chickering Hall, Monday, November 18, at 8.30 o'clock P.M.

Vice-President Viele in the chair.

The following persons, recommended by the Council, were elected Fellows of the Society:

Asa A. Alling,	Joseph G. Butler, Jr.,
Walter S. Carter,	Allen S. Williams,

Grant Squires.

The Chairman then introduced the speaker of the evening, Maj. Alfred F. Sears, who delivered an address on the Geographic Conditions that make Commercial Cities.

On motion, the Society adjourned.

A Regular Meeting of the Society was held at Chickering Hall. on Monday, December 9, at 8.30 o'clock P.M.

President Daly in the chair.

The President, as one of the Delegates to the Sixth International Geographical Congress, held in London, July 26–August 3 last, added some words to the report printed in the Bulletin of September 30.

The Congress was remarkable for the number and the distinction of the representatives from all countries, for its thorough organization—the work of the Royal Geographical Society—and for the spirit of harmony which marked its deliberationa and discussions. The Exhibition included foreign collections of maps and publications, governmental and private, exhibits of learned societies, collections of paintings and photographs, travelling outfits and equipments, a loan historical collection, and many scientific instruments; forming a display, interesting and instructive in the highest degree.

The Congress unanimously recognized the importance of the following subjects, still presenting themselves, for the most part, as problems: The Mapping of the World on a scale of 1:1,000,000; the Systematic Mapping of Africa; Antarctic Exploration; International Co-operation in the Survey of the Baltic, the North Atlantic and the North Sea; A Uniform System of Seismic Observations; the Dating of all Maps; the State Printed Registration of Literature; and the Constitution of an International Institute of Geographical Science, according to a definitive plan to be submitted to the Seventh International Geographical Congress.

The character of these resolutions shows, what was more and more evident to all who attended the last Congress, that these international gatherings have passed beyond the experimental stage; and have assumed definite consistency as a permanent civilizing force. We must look with satisfaction and encouragement to the meeting of the Seventh Congress, at Berlin, in 1899.

The President then introduced to the Society the speaker of the evening, Dr. Franz Boas, who gave an account of his researches among the Indians, in a Winter's Cruise in British Columbia.

On motion, the Society adjourned.

ANNOUNCEMENT.

The following gentlemen will address the Society, on the dates named:

Jan'y 13. Mr. Cyrus C. Adams, on
Progress in Africa.

Feb'y 10. Civil Eng. R. E. Peary, U. S. N., on
Work in North Greenland in 1894 and 1895.

March 9. Prof. T. C. Mendenhall, on
The Alaska Boundary Question.

INDEX TO VOL. XXVII.

PAGE

Abîmes, Les, les Eaux Souterraines, etc. Par E. A. Martel.......... 86
Abyssinia, Russian Expedition to.. 70
Accessions to the Library, 106, 206, 327, 422
Actual Africa; or, The Coming Continent. By Frank Vincent....... 198
Adirondacks, Survey of............ 23
Afrique Australe, A Travers l'..... 90
Alaska Boundary...............57, 392
—— Condition of............... 81
—— Distribution of Magnetic Declination in...................... 198
—— Exploration of Mineral Fields in......................... 189
—— Governor's Report, 1895...... 391
—— Growth of................. 316
—— Topographical Reconnoissance of, recommended............... 316
American Association, The......... 352
American Geographical Society, Resolution of Council of the......... 126
Andrea Bianco Map of 1448, and supposed Discovery of Brazil in 1447......................... 398
Andrée, M. His Plan for Reaching the North Pole by Balloon....... 175
Andreieffski, Catholic Mission at... 147
Animal Life of Peru............... 264
Annales de Géographie, Bibliography of 1893 in..................... 56
Antarctic Exploration............. 402
Argentina-Brazil Boundary......... 81
Ascent of the Red River to the Chinese Frontier.................. 67
Atlas. Debes' Neuer Handatlas, noticed....................103, 420
—— de Géographie Historique, noticed......................... 419
—— der Oesterreichischen Alpenseen......................... 420
—— De Guinea en Equatoriaal Stroomen......................... 420
—— of the United States......... 418
—— "The Times,"............... 421
Atolls and Barrier Reefs........... 172
Autograph Letters of Mercator..... 397
Baker, Marcus. The United States Geological Survey in 1894........ 42
Baltic and North Sea Canal, The... 178
Barren Lands Explored by J. B. Tyrrell....................... 51
Baschin, Otto, and Ernst Wagner Bibliotheca Geographica........ 203

PAGE

Becker, G. F., on Gold-producing Districts of the Appalachian Region......................... 189
Belgian Antarctic Expedition, A.... 56
Berlin, Population of............. 408
Bibliography of 1893, in the Annales de Géographie.................. 56
Bibliography of the Future, The. By Frank Campbell............ 200
Bibliotheca Geographica. Herausgegeben von der Gesellschaft für Erdkunde zu Berlin............ 203
Bien, Joseph R. Atlas of the State of New York.................. 204
Biological Map of North America.. 390
Biological Reconnoissances in the United States 311
Board on Geographic Names, The U. S......................192, 402
Bogue, Virgil G. Stampede Pass, Cascade Range, Washington..... 239
Book Notices.........86, 198, 320, 411
Borchgrevink, C. E., on the Voyage of the Antarctic to Victoria Land. 295
Boundary, Northeastern, of Maryland......................... 314
Boundary, Pennsylvania and Delaware......................... 313
Brigham, Albert Perry. The Composite Origin of Topographic Forms 161
Burton, C. M. A Chapter in the History of Cleveland............ 322
Büttikofer, J. Exploration in Borneo 69
Cabots, Voyages of the. By Samuel Edward Dawson............... 88
California Electrical Storms........ 177
Campbell, Frank. The Bibliography of the Future.................. 200
Canada, Alaska Boundary Survey... 51
Canada, Geographical Work in, 1894. By Dr. George M. Dawson...... 50
Canal, The Baltic and North Sea... 178
Cassini de Thury, Monument to.... 56
Castillo, Don Antonio del, Death of. 408
Catacaos, Manufacturing Industry of 270
Census of 1890, Printing of, Delayed 307
Chagas, Manoel Pinheiro, Death of. 179
Chamberlain, Basil Hall, on the Luchu Islands.................. 181
Chapman, Lieut.-General. Suggestions concerning the Map of Africa 185
Cherokees, Area belonging to...... 272

PAGE

Chickasaws, Area belonging to..... 272
Choctaws, Area belonging to....... 272
Churches in the United States...... 279
Cleveland, A Chapter in the History of. By C. M. Burton........... 322
Climate of San Diego, California.... 177
Coast Desert of Peru, The. By Alfred F. Sears.................. 256
Coast Islands, Formation of........ 172
Coast Range of Alaska, Geology of.. 60
Coleman, A. P., Exploration in Rocky Mountains by.................. 54
Collingridge, G. The Discovery of Australia...................... 412
Columbian Historical Exposition in Madrid, Report of Commission to. 309
Columbus, The First Landfall of. By Jaques W. Redway............. 89
Colvile, Col. Sir H. The Land of the Nile Springs............... 413
Committee of Ten on Secondary School Studies.................. 30
Composite Origin of Topographic Forms, The. By Albert Perry Brigham..................... 161
Conference on Geography, Chicago, 1892........................ 30
Congo Railway, The.............. 75
Continental Borders and Insular Masses, Development of......... 171
Corvée, The, in Egypt in 1894...... 72
Cotton in Korea.................. 10
—— in the Piura Valley, Peru...... 265
—— in Turkestan................. 66
Courtellemont, M. Gervais, at Mecca 68
Creeks, Area belonging to.......... 272
Crossing Streams in Alaska........ 159
Daly, Charles P. Letter to the Secretary of the Navy.............. 127
Davidson, Prof., The Removal of... 279
Dawson, George M. Geographical Work in Canada, 1894.......... 50
—— Samuel Edward. Voyages of the Cabots, etc................. 88
—— W. Bell. Survey of Tides and Currents in Canadian Waters..... 201
Deaths by Wind and by Lightning in the United States, 1890–1893.... 282
Definitions of Geographical Names. By Dr. Konrad Ganzenmüller.... 93
DeKalb, Prof. Courtenay. Review of Raimondi's Work in Peru...... 283
Delaware, Boundary Line between Pennsylvania and............... 313
Density of Population in the United States....................... 277
Department of Piura in Peru....... 269
Determination of Levels in Russia.. 65
Deutsch-Afrikanische Schutzgebiet, Das. Von Dr. Karl Peters...... 323
Diebitsch, Emil. Circulars on Greenland Scientific Expedition....... 128

PAGE

Discovery of Australia, The....... 412
Dutreuil de Rhins Expedition, The. 284
Eagle River, Labrador............ 64
Eastern Bi-metallic League, The. By H. Kopsch................. 92
Egli, J. J., Namenkunde.......... 415
Egypt, The Corvée in, in 1894..... 72
Electrical Storms in California...... 177
Elliot, G. F. Scott, at Mt. Ruwenzori. 74
Emin Pasha, The Death of........ 72
English Lakes, The. By H. R. Mill 411
Enjoy, M. d', in the Moï Country... 288
Escape of Slatin Bey.............. 77
Eskimos of Southern Labrador..... 64
Expedición Científica al Popocatepetl 413
Exploration in Rocky Mountains. By A. P. Coleman.............. 54
—— in Western Borneo........... 69
—— of Labrador. By A. P. Low.. 53
Explorations in Labrador, 1894. By Charles E. Hite................ 63
Fanning Island, Landing for a Pacific Cable................... 196
Father de Hert, on the Congo Railway.......................... 75
Fiorini, M. Sopra Tre Speciali Projezioni Meridiane e i Mappamondi Ovali del Secolo XVI........... 324
Fortschritte der geog. Namenkunde. J. J. Egli...................... 415
Franklin Celebration, The......... 174
French Map, The, of New York.... 22
Frye, Alex. Everett. Primary Geography......................... 93
Gabb, William M. Exploration of Talamanca..................... 405
Gannett, Henry, Dictionary of Geographic Positions in the U. S. by.......................... 388
Gannett, Henry. Indian Territory. 272
Gannett, Henry. The Mapping of New York State....... 21
Ganzenmüller, Dr. Konrad. Definitions of Geographical Names, etc. 93
Geogenetische Beiträge. Von Dr. Otto Kuntze.................. 325
Geographical Congress, Second Italian........................... 175
—— Congress, The Sixth International...............134, 226, 291
—— Notes............55, 174, 277, 396
—— Society of the Pacific, Memorial by........... 280
—— Work in Canada, 1894. By Dr. George M. Dawson............. 50
Geographic Distribution of Life in North America................ 311
Geographic Names, The U. S. Board on........................ 192, 402
Geographische Zeitschrift.......... 326
Geography, Primary. By Alex. Everett Frye.................. 93

PAGE

Geography, Report of a Conference on. By Israel C. Russell........ 30
Geological Reconnoissance Across Idaho........................ 315
Geologic Atlas of the United States, The Development of the. By Bailey Willis............. 337
Geologic Maps of the United States.....................189, 389
Glaciers on Lynn Canal, Alaska.... 160
Glave, E. J., Reported Death of... 187
Gold Diggings of Cape Horn. J. R. Spears..................... 416
Götzen, Count von. Expedition Across Africa.................. 76
Grand Falls, Labrador............ 53
Greenland for Art................ 62
—— North, Expedition........... 300
—— Scientific Expedition of 1895.....................126, 221
Grenard, Fernand. Report on the Dutreuil de Rhins Expedition.... 284
Griffis, Wm. Elliot. Korea and the Koreans, in the Mirror of their Language and History.......... 1
Guiana-Venezuela Boundary........ 80
Harper's Station on the Upper Yukon 153
Highways of Commerce, A Guide Book.......................... 394
Hirth, Prof. Dr. Friedrich. Die Länder des Islâm nach Chinesischen Quellen, I................ 198
Hite, Charles E. An Excursion in Labrador, 1894................ 63
Idaho, A Geological Reconnoissance Across 315
Identity of Level in Baltic, Black and Azof Seas.................... 65
Illustration. Miners Ascending the Upper Yukon................. 154
—— Miner's Family on the Upper Yukon 152
—— Mount Rainier seen from Tacoma.................... 254
—— Sub-soil Ice on the Bank of the Yukon 149
—— View on Green River......... 250
—— Yukon River, near the Lower Ramparts..................... 148
India, Northern, Topography and Scenery of. By Herbert M. Wilson 360
Indian Reservations in Indian Territory......................... 272
Indians in the United States....... 278
Indian Territory. By Henry Gannett 272
—— Territory, Government of the Tribes in..................... 274
—— Territory, Survey and Subdivision of Lands in............. 388
Irrigation, Gift of Public Lands for. 195
—— Problem of, in Peru.......... 271
—— Surveys in Canada........... 50

PAGE

Ismaïl Pasha, Obituary............ 85
Istapa, The Port of............... 83
Italian Geographical Congress, The Second....................... 175
—— Geographical Society, Publications of....................... 56
—— Population in New York...... 403
Jackson-Harmsworth Expedition... 400
Journey to Mecca. By M. Gervais Courtellemont................. 68
Journey up the Yukon River, A. By Israel C. Russell............... 143
Kano, the Commercial Centre of the Sudan......................... 321
Kapuas River, Borneo............ 69
Kate's Needles, Height of......... 58
Kingsley, Miss, in West Africa... 408
Kite, Arrival of the, at St. John's... 300
Kivu Lake...................... 76
Knoblauch, Dr. Hermann, The Death of..................... 290
Kopsch, H. The Eastern Bi-metallic League....................... 92
Korea and the Koreans, in the Mirror of their Language and History. By Wm. Elliot Griffis........... 1
Korea, Mir-yeks or Stone-men in... 7
—— Mythical Zoölogy of........ 9
—— or Cho-sen, the Land of the Morning Calm. By A. Henry Savage-Landor................ 92
—— Reform in.................. 19
Korean Language and Literature, Character of.................. 12
Korean Revolution of 1884........ 16
Korean Yang-ban (non-producing people)...................... 15
Koreans, a People of many Races.. 3
Kuntze, Dr. Otto. Geogenetische Beiträge..................... 325
Labrador, An Excursion in, 1894... 63
Labrador, Exploration of. By A. P. Low......................... 53
Lake-Basins, Origin of........... 170
Land of the Nile Springs. Sir H. Colvile...................... 413
Länder des Islâm nach Chinesischen Quellen, Die, I. Von Prof. Dr. Friedrich Hirth................ 198
Land Tenure in Indian Territory... 274
Leclercq, Jules. A Travers l'Afrique Australe...................... 90
Libbey, William, Jr., on Peary's Expedition. 62
Life Regions in the United States.. 312
Lindenkohl, A. Alaska Boundary Measurement in 1893........... 57
Littlehales, G. W. Contributions to Terrestrial Magnetism, the Variation of the Compass.. 195
Low, A. P. Exploration of Labrador by....................... 53

PAGE
Luchu Islands... 181
Lyang Kulung Mountain, Borneo... 70
Mackenzie River, Exploration of the. 176
Madrid, Columbian Historical Exposition in... 309
Magnetic Declination in Alaska, etc., 1895. By C. A. Schott... 198
Manchuria, Rev. John Ross' Description of... 183
Man with a Tail, A. (In Indo-China) 288
Map. Alabama, Geological Map of, with Explanatory Chart... 97
—— Carta Geográfica del Ecuador, 101
—— Carte de l'Indo-Chine... 101
—— Kultur-Karte der V. S. von Amerika, etc... 96
—— Mapa de la Provincia de Catamarca... 102
—— Mortalità per Infezione Malarica, ecc... 97
—— Notices... 94, 204, 418
—— of Eastern China, Japan and Korea... Facing 1
—— of part of British and German East Africa... 101
—— Physical Geography of North America... 97
—— showing Exploration of Stampede Pass... Facing 239
—— showing Surveyed Area of the State of New York... Facing 29
—— showing Triangulation of the State of New York... Facing 28
—— Topographic, of New York State, Agreement for Construction of... 25
—— Waeber's, of Northeastern China... 101
Mapping of New York State, The. By Henry Gannett... 21
Maps. Atlas des Côtes du Congo Français... 102
—— Atlas Général Vidal-Lablache 102
—— Atlas of the State of New York 204
—— Epoch, Illustrating American History... 95
—— Geologic, of the United States. 189
—— Gewässer und Höhenkarte des Königreichs Württemberg im Massstab, 1: 600.000... 205
—— Grundzüge der Physikalischen Geographie von Guatemala... 100
—— issued by the U. S. Government... 103
—— Rain and Snow, of the United States, etc... 94
—— to accompany Report on Surface Geology of New Jersey... 99
—— Topographic, of the United States... 191
Martel, E. A. Les Abîmes, etc... 86
Maryland, Northeastern Boundary of 314

PAGE
Mazamas Enterprise, The... 283
Mazamas, Heliographic Messages sent by the... 176
Mecca, A Journey to. By M. G. Courtellemont... 68
Medanos, The, in Peru... 262
Mercator, Autograph Letters of... 397
Meteorology of the Pamir Post, Turkestan... 66
Meteorology, Weather and Methods of Forecasting, etc. By Thomas Russell, U. S. Assistant Engineer. 199
Mill, Hugh R. The English Lakes 411
Michicamow Lake... 53
Milne, John. A Letter on the Destruction of his Observatory... 180
Mississippi, Source of the... 57
Mitchell, John H. Oregon, its History, Geography and Resources... 202
Mohun, R. Dorsey. Account of Emin Pasha's Death... 72
Moïs, M. d'Enjoy among the... 288
Molengraaf, Prof., in Borneo... 70
Mongolia and Tibet, Diary of a Journey through... 91
Monteil, Lieut. Col. P. L. De Saint-Louis à Tripoli par le Lac Tchad. 320
Mosquitoes in Alaska... 150
Mt. Adams, Measurement of... 283
Mt. Augusta, Height of... 60
Mt. Cook, Height of... 60
Mt. Hubbard, Height of... 60
Mt. Huxley, Height of... 60
Mt. Logan, Position and Height of. 60
Mt. Newton, Height of... 60
Mt. Ruwenzori, Exploration of... 74
Mt. St. Elias, Height of... 60
Mt. Vancouver, Height of... 60
Muller, M. Emil. Note on Observations on the Pamir... 65
New York, Agreement for Construction of a Topographic Map of... 25
—— Area Surveyed, 1895... 27
—— French Map of... 22
—— Italian Population in... 403
—— Method Employed in Surveying 27
—— State, Mapping of. By Henry Gannett... 21
—— State Survey of, 1876... 22
—— Triangulation by the U. S. Coast and Geodetic Survey... 23
—— Triangulation by the U. S. Lake Survey... 23
—— U. S. Geological Survey in... 24
Nicaragua Canal, Notice of Report on... 317
Nile and the Corvée, The... 71
North America, Biological Map of.. 390
North American Polar Expedition.. 175
Nor'-westers of Canterbury... 409
Obituaries... 84, 290
Ocean, Greatest Depth of the... 396

PAGE

Oregon, its History, Geography and Resources. By John H. Mitchell. 202
Osborn, Capt. Sherard, quoted..... 2
Pacific Ocean Cable................ 82
Pamir, A Year's Observations on the 65
Payer, Julius von. Proposed Greenland Expedition................. 62
Peary, Mr., The Reception of...... 373
Peary, Mrs. R. E. Letter on the Greenland Scientific Expedition of 1895......................... 132
Peary, R. E., Letter from......... 300
Peary's Work in Greenland.... ... 60
Peck, Dr. Reinhard, The Death of.. 179
Pennsylvania and Delaware Boundary Line...................... 313
Percentages of White and Negro Population in the United States. Table........................ 278
Persons of Foreign Parentage in the United States............... .. 278
Peru, Coast Desert of. By Alfred F. Sears......................... 256
Peru, Raimondi's Work in......... 283
Peters, Dr. Karl. Das Deutsch-Afrikanische Schutzgebiet....... 323
Phototopography, as practiced in Italy and in the Dominion of Canada........................ 319
Pole, To the, by Balloon...... ... 175
Popocatepetl, Expedición Científica al 413
Population of the United States, The 277
Porcupine River, Alaska........... 150
Precipitation in the United States in 1893............ 280
Progress of Population in the United States. Table.................. 277
Projet de Construction d'un Globe. E. Reclus...................... 414
Rabot, M. Charles, on Mr. Peary's Work in Greenland............. 60
Raimondi's Work in Peru.......... 283
Rawlinson, Sir Henry, Obituary.... 84
Rebeur-Paschwitz, E. von, on Prof. Milne's Observations............ 181
Reception of Mr. Peary, The...... 373
Reclus, E. Projet de Construction d'un Globe..................... 414
Red River, Cochin China, Ascent of............................. 67
Redway, Jacques W. The First Landfall of Columbus 89
Remsen, William, Obituary........ 84
Reports of a Conference on Geography. By Israel C. Russell....... 30
Resolutions Adopted by the Sixth International Geographical Congress.......................... 298
Rey-Pailhade, M. J. de........... 175
Roads, Construction of, in Various States......................... 317

PAGE

Rockhill's Notes on the Ethnology of Tibet........................ 196
Rockhill, William Woodville. Diary of a Journey through Mongolia and Tibet................. ... 91
Ross, John, D.D., on Manchuria.... 183
Royal Geographical Society of Victoria, Open Air Session of........ 187
Ruanda, The Country of.......... 76
Russell, Israel C. A Journey up the Yukon River.................... 143
Russell, Israel C. Reports of a Conference on Geography........... 30
Russell, Thomas. Meteorology, Weather, and Methods of Forecasting, etc...................... 199
Russia, Determination of Levels in.. 65
Russians in Abyssinia............. 70
Saint-Louis à Tripoli par le Lac Tchad, De. Par le Lieut.-Colonel P. L. Monteil.................. 320
Samoa Commission................ 83
San Diego, California, The Climate of............................. 177
Savage-Landor, A. Henry. Korea, or Cho-sen, etc................. 92
Scales Adopted by the U. S Geological Survey.................... 44
Schott, C. A. Distribution of the Magnetic Declination in Alaska, etc., 1895...................... 198
Scientist, The Word.............. 78
Scott-Moncrieff, Sir C. C., on the Nile and the Corvée............ 71
Sears, Alfred F. The Coast Desert of Peru......................... 256
Secretary of the Navy, The. Letter to Charles P. Daly.............. 128
Seminoles, Area belonging to...... 272
Sixth International Geographical Congress 134, 226, 291
Slatin Bey, Escape of.......... .. 77
Slatin Pasha. Address before the Sixth International Geographical Congress...................... 292
Smith, Donaldson, on the Webi Shebeli and the Web Rivers...... 186
Smith, Dr. Donaldson, in Africa... 74
Smithsonian Institution........... 79
Société des Amis des Explorateurs Français.... 55
Societies, Federation of, in Washington............................ 83
Society, Spelæological............. 87
Sopra Tre Speciali Projezioni Meridiane e i Mappamondi Ovali del Secolo XVI. M. Fiorini........ 324
Source of the Mississippi.......... 57
Spears, J. R. Gold Diggings of Cape Horn.............. 416
Stampede Pass, Cascade Range, Washington. By Virgil G. Bogue 239

PAGE
State Survey of New York, 1876.... 22
Stikine River, The................ 58
Sub-division of Lands in Indian Territory begun................ 275
Survey of the Adirondacks......... 23
—— of the Indian Territory authorized........................ 192
—— of Tides and Currents in Canadian Waters. Reports by W. Bell Dawson, C. E................. 201
—— The U. S. Coast and Geodetic 23, 392
—— The U. S. Geological, folios of, described.................. 47
—— The U. S. Geological, in 1894. By Marcus Baker................ 42
—— The U. S. Geological, in New York......................... 24
—— The U. S. Geological, Scales Adopted by..................... 44
—— The U. S. Lake, in New York, 23
—— West of Hudson Bay. By J. B. Tyrrell......................... 51
Surveys, Consolidation of the Government......................... 80
Surveys, Government, Triangulation, by....................190, 386
Taku River, The................. 59
Talamanca, Exploration of........ 405
Thomson, Joseph, The Death of... 290
Tibet, Notes on the Ethnology of. By W. W. Rockhill............. 196
Timber Line in the Taiya Valley, Alaska......................... 160
Tokyo Seismological Observatory... 180
Tonkin and the Red River......... 67
Topographical Reconnoissance of Alaska, recommended........... 316
Topographic Forms, The Composite Origin of. By Albert Perry Brigham........................ 161
Topographic Maps of the United States..................191, 386, 418
Topography and Scenery of Northern India. By Herbert M. Wilson... 360
Transactions of the Society, 121, 220, 435
Tundra of Alaska................ 145
Tyrrell, J. B., Survey by.......... 51

PAGE
United States, Atlas of the......... 418
—— Biological Reconnoissances in the.......................... 311
—— Board on Geographic Names, 192, 402
—— Department of State, Highways of Commerce, a Guide Book. 394
—— Development of the Geologic Atlas of the. By Bailey Willis... 337
—— Dictionary of Geographic Positions in........................ 388
—— Geological Survey, Annual Report........................ 385
—— Geological Survey in 1894, The. By Marcus Baker............. 42
—— Geological Survey, Origin of the......................... 42
—— Government Collections Opened to Students................... 309
—— Hydrographic Office.......192, 393
—— Military and Naval Records... 394
—— National Museum, Report of, for 1893....................... 307
—— The Population of the........ 277
—— Precipitation in, in 1893....... 280
—— Total Area Mapped, 1894..... 44
Unuk River, The.................. 58
Utah Admitted................... 393
Venukoff, M., on Determination of Levels in Russia................ 65
Vincent, Frank. Actual Africa; or, The Coming Continent.......... 198
Voyages of the Cabots in 1497 and 1498. By Samuel Edward Dawson.......................... 88
Wagner, Ernst (and Otto Baschin). Bibliotheca Geographica......... 203
Washington Letter....79, 189, 307, 385
Webi Shebeli River, The.......... 186
Willis, Bailey. The Development of the Geologic Atlas of the United States.......................... 337
Wilson, Herbert M. Topography and Scenery of Northern India... 360
World's Exhibition at Amsterdam... 55
Yukon River, A Journey up the. By Israel C. Russell............... 143
Zona Seca, The, of Peru........... 259